QUESTIONS ON COST-BENEFIT ANALYSIS

-What are the economic costs of the production and environmental inputs needed to implement the proposed project, or activity?

- What are the potential economic environmental benefits and costs derived from the implementation of the proposed project, or activity?
- Who bears the economic environmental costs and who receives the economic benefits of the proposed project, or activity?

- What is the economic value of the potential environmental improvement that the implementation of the project, or activity, under consideration would bring about?

- What is the economic cost of preventing the environmental degradation that the implementation of the proposed project, or activity, might have?

- What would be the economic cost of introducing environmental control activities in the project design? How much would it cost to meet local environmental standards?

- How much would it cost to design options and alternatives for project implementation?

- Are the benefits of implementing tightened environmental standards greater than the costs to society?

- What would be the economic loss, or gain, of the project outputs if its design is modified to consider the environment?

56. The final objective of UNDP staff should be to compare all costs and benefits and attempt to maximize benefits and reduce the costs, by introducing modifications to the project that are economically feasible and still achieve the original goals proposed by the project.

## QUESTIONS ABOUT THE PRESENCE OF ENVIRONMENTAL SOCIAL COSTS AND BENEFITS

- What environmental social costs, or benefits, will occur with the implementation of the UNDP sponsored Country Programme, Technical Cooperation, project or activity?

- Which of the idndentified social costs and benefits will affect economic output and which will affect social and individual welfare?

- Are any of the identified social costs threatening the survival of indigenous people?

- Which social preferences would override the economic and social benefits derived from the outputs and earnings of the project?

- Would the project offer any compensation to those who experience social distress related to the activity?

## QUESTIONS ABOUT THE ECONOMIC VALUE OF ENVIRONMENTAL SOCIAL COSTS AND BENEFITS

- What is the full, or partial, economic value of the social environmental costs and benefits derived from the implementation of a project or activity?

- How do different sectors of society value these environmental benefits and costs?

- Who (a) receives the environmental social benefits and (b) bears the costs?

- Would these social groups be in a position to pay to preserve and protect their environment?

## QUESTIONS ON THE ENVIRONMENT AND BASIC NEEDS

- Does the proposed UNDP sponsored activity contribute to the satisfaction of human needs?

- Does the UNDP Country Programme, Technical Cooperation, project or activity, include human resource development programmes aimed at ameliorating the environment?

## QUESTIONS ABOUT WOMEN AND THE ENVIRONMENT

- Have women's welfare and participation been taken into consideration while designing the UNDP sponsored activity?

- Have women participated in setting the environmental priorities and objectives of the planned UNDP sponsored assistance?

- Has there been consultation with women's organizations regarding the proposed UNDP sponsored activities?

- Does UNDP sponsored environmental <u>training</u> give equal opportunity to women? Are women's environmental concerns and potential contributions to environmental management and sustainable development considered in training programmes?

## QUESTIONS ABOUT CULTURAL IMPLICATIONS

- Are there any ethnic groups that could be affected by the implementation of the UNDP sponsored project, or activity?

- Are there any historical sites that would be destroyed by the implementation of the project?

- What is the perception of ethnic groups regarding the implementation of the proposed project?

- Would people living in the local project area participate in the implementation of the project? Would this participation affect their life styles?

- What would be the economic cost of protecting cultural values in the project area?

## QUESTIONS ON OCCUPATIONAL HEALTH AND THE ENVIRONMENT

- Does the project include any activity, or process which might jeopardize workers health?

- Is the technology proposed by the project environmentally safe for workers?

- What would be the economic cost of including actions to protect the working environment?

- How could economic output be increased through environmental protection in the work place?

- What would be the cost of environmental training activities?

- Are any of the materials to be produced, or utilized during the implementation of the project banned or severely restricted in the country or elsewhere?

## QUESTIONS ON EDUCATION AND THE ENVIRONMENT

- Does the UNDP Country Programme under preparation include any environmental education activities?

- What is the level of environmental awareness in the country where UNDP is providing technical assistance?

- Is the country where UNDP is providing technical assistance making use of available international and regional environmental education opportunities?

- What would be the economic cost, and the expected economic and social benefits, associated with the introduction of environmental education activities and training within a UNDP Technical Cooperation scheme, Country Programme or Project Cycle?

- Are there any educational activities on environmental planning and resource development, and on environmental impact assessment in the country where UNDP is providing technical assistance?

## QUESTIONS ON NGO'S PARTICIPATION

- Has the UNDP Country Programme and Technical Cooperation scheme considered the participation and collaboration of local, national, regional and international environmental NGOs?

- Has the local UNDP field office being able to identify local environmental NGOs?

- How do the workplans and programmes of local environmental NGOs coincide, or conflict, with national plans to protect the environment?

- Has UNDP considered giving economic and technical assistance to local environmental NGOs?

- What would be the cost, and potential benefits that would be derived from enveloping local environmental NGOs in UNDP's activities?

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valuable fertilizer to depleted soils are often used as fuel to supplement scarce wood supplies. (ESCAP, 1991)

### 3.3 AGRICULTURE AND RANGELANDS

FAO estimated in 1981 that 54.7 million hectares (84 percent) of Afghanistan was rangeland, 7.9 million hectares (12 percent) arable and only 2.2 million hectares (3.4 percent) forest. In 1989, UNDP estimated that 3.2 million hectares was reported to be under cultivation, that is five percent of the country: 46 percent of the cultivated total is grazing land, and of that 2.6 percent is forest and woodland. Of this forested area, only a few small areas in the east represent intact forests.

These figures would suggest a decline in forested areas from 3.4 percent in 1981 to 2.6 percent in 1989. The difference between total arable land estimated by FAO in 1981 of 7.9 million hectares and the 1989 figure of 3.2 million hectares comes from a reduction in active cultivation of land plus an increase in degraded land.

The UNDP Development Cooperation Report of 1989 reports that agricultural production decreased by approximately 2.5 percent between 1988 and 1989, and by 20 percent between 1987 and 1989. In 1989 a total of 3.2 million hectares of land was reported to be under cultivation (2.1 million irrigated and 1.1 million rainfed), 835,000 hectares less than in 1988. Although the decline in agricultural production was mainly the result of the security situation which adversely affected the availability of labour for farming and maintenance of agricultural infrastructure, inadequate irrigation and scarcity of fertilizers and pesticides were also contributing factors. (UNDP, 1989)

### 3.4 WETLANDS

There are three types of wetlands in Afghanistan -- river courses, lakes and marshes, and artifical lakes. Since most of Afghanistan is very dry, the few wetlands that exist are of considerable importance.

Most river courses are liable to great seasonal variation in water level, and are subject to intensive human use. Most of the unmanaged rivers are not particularly rich wildlife habitats with the exception of the Amu Darya which meanders through an extensive area of natural marsh and scrub (*Salix* spp). Under climax vegetation conditions, the river valley ecosystems have supported forests and a variety of wildlife, however the lack of soil along most contemporary river courses is a consequence of the erosion that follows removal of the vegetation by cutting and overgrazing. Natural conditions would have supported a rich fauna including some large mammals now rare or extinct in Afghanistan.

Many of Afghanistan's rivers have no outlet to the sea and drain into a series of depressions from which water is lost by evaporation. This results in the formation of large shallow saline lakes and marshes, the most extensive being those of Seistan in the southwest. These biologically productive ecosystems are mineral rich and considered to be of international importance for migrating and wintering waterfowl. Hamun-i-Puzak, Ab-i-estada and Dashte Nawar are the three wetlands of outstanding importance as habitat for

water birds.

Artifical bodies of water such as Qargha, Sarobi and Darunta Lakes are not as rich biologically as the wetlands mentioned above, however they do support fish populations as well as habitat for fish-eating species of birds. (UNDP/FAO, 1981)

### 3.5 FAUNA

The Afghan fauna is characterized by many animals adapted to arid steppe or mountain conditions. The large herds of wild asses (*Equus hemionus*) and gazelles (*Gazella* spp), which until recent times populated the steppes, have been almost exterminated by hunting. Similarly their predators, the cheetah (*Acinonyx jubatus*) and to a lesser degree the hyaena (*Hyaena hyaena*), have declined. Their associated arthropod fauna, such as the dung beetles (*Scarabaeidae*) which are often host specific, have also presumably disappeared. The forests and mountains harboured large numbers of wild goat (*Capra aegagrus*), urial (*Ovis orientalis*), ibex (*Capra ibex*), markhor (*Capra falconeri*), and Bactrian deer (*Cervus elaphus bactrianus*), feral yak (*Bos grunniens* (E)), otter (*Lutra lutra*), marte n(*Martes foina)* and long tailed marmot (*Marmota candata*). These also have been much reduced by hunting and habitat degradation.

Predators, such as the Turanian tiger (*Panthera tigris virgata*) -- probably extinct in Afghanistan, the snow leopard (*Panthera uncia*), the leopard (*Panthera pardus*), wolf *(Canis lupus*), red fox (*Vulpes vulpes*), brown bear (*Ursus arctos*), ermine (*Mustela ermin)* and lynx (*Lynx lynx*), much sought after for their furs, are now rarely seen. Only relatively protected or isolated areas such as the Pamirs with its famous Marco Polo sheep (*Ovis ammon poloi*) have retained their fauna.

In the migration season huge numbers of birds migrate from Siberia through Afghanistan to the warmer Indian peninsula and Africa. During these seasons the wetlands through the country serve as an essential resting place for the thousands of waders, ducks and other waterfowl. The rare Siberian crane *(Grus leucogeranus)* the greater flamingo *(Phoenicopterus roseus)* and the falcon *(Falco cherrug)* are among these species. For these birds, the Afghan wetlands are an essential stop for resting and feeding during their migrations. Many birds also overwinter in these wetlands.

Fish and amphibians are scarce in such an arid country. Trout are found, however, in many mountain streams, and reptiles are abundant. The insect fauna is poor in species but certain pest species such as the desert locust are quite numerous at times. (UNDP/FAO, 1981)

Man has strongly influenced the fauna, both directly by hunting and indirectly by altering its habitat, by grazing livestock, burning practices and fuel collection. In addition the prolonged war has taken its toll on more than the human population.

It is impossible to obtain an accurate estimate of current wildlife populations. Access to important wildlife habitat areas is severely restricted due to heavy fighting and/or mined areas. However, from all the descriptive accounts of field and village project workers, there are few local sightings of wildlife species. Occasional wolf and fox sightings are mentioned by villagers and in Mission Reports, particularly in the mountainous areas of the northeast.

A quick perusal of the Kabul fur shops indicates substantial numbers of wolf and fox pelts, along with less numerous pelts of snow leopard and leopard. One shop had a baby leopard coat displayed in the window. Strings of ducks and other waterfowl are frequently seen in the market in Kabul, which indicates that indiscriminate shooting of these birds continues. Falcons and other raptors have been captured and sold for Arabian falconry purposes or killed indiscriminately. It is reported that birds such as the rare Siberian crane *(Grus leucogeranus)* have been captured in Bannu, south Waziristan, where there is a traditional trade in capturing cranes to tame as domestic pets and watchdogs. (FAO, 1990)

Hunting has been an increasing problem for the past several decades as indicated in FAO reports from 1973, 1977 and 1981. A marked increase in the number of firearms due to the war, coupled with increased necessity for food and money, have apparently meant that wildlife species have been hunted, shot and trapped at an alarming rate.

Some field workers have hope that a few wildlife habitats temporarily exempt from hunting pressure due to mines and heavy fighting may provide a temporary sanctuary for remaining species, allowing some populations to increase. However it is feared by most people interviewed that once peace returns to Afghanistan, without stringent regulations many species will be doomed to extinction.

## 3.6 PROTECTED AREAS

There is one national park, Bande Amir. Two waterfowl sanctuaries, Ab-i-Estada and Dashte Nawar, have been gazetted in response to petitions submitted to the Head of State (FAO, 1981). Afghanistan ratified the World Heritage Convention on March 20 1979, however with the onset of war that same year no further actions have been taken in the field of conservation and protected areas.

The Protected Areas Data Unit of the World Conservation Monitoring Centre at Cambridge published a draft report in 1988 containing the following candidate protected areas sites.

### 3.6.1 Ab-i-Estada Waterfowl Sanctuary

Located in the Hindu Kush Highlands in Ghazni Province, southeast Afghanistan, Ab-i-Estada together with Dashte-Nawar to the north is a vital staging ground for migratory waterfowl and waders of the Siberian-Kazakhstan/Pakistan-India population (in particular the rare Siberian crane *Grus leucogeranus*) as well as an essential breeding ground for the greater flamingo *Phoenicopterus roseus*. The international importance of the two sites was recognized at the 1971 International Conference on Wetlands and Waterfowl which adopted the Ramsar Convention. Ab-i-Estada is also an important archaeological site exhibiting stratigraphic sequences. Several early dwelling mounds have been discovered with accompanying artefacts which suggest occupation from Palaeolithic to Buddhist times. (Shank and Rodenberg, 1977)

In addition to damage from war, threats to the area come from extensive grazing by domestic stock and from irrigation projects that divert water thereby decreasing water levels and increasing salinity. Egg collection, disturbance during breeding and hunting throughout the year are other significant problems. In 1978 there were an estimated 70 Siberian cranes

in the Indo-Soviet flock; only 17 are known to survive in 1990. Siberian cranes have historically used Ab-i-Estada as a stopover rest site but no scientists have visited the lake in the last decade to confirm whether this is still the case.

### 3.6.2 Ajar Valley Wildlife Reserve

In the Hindu Kush Highlands northwest of Bamiyon, this area was used as a hunting reserve by royalty since the turn of the century and protected as such since the early 1950s. Proposed as a national park by FAO in 1978, the area contained ibex (*Capra ibex*), Bactrian deer (*Cervus elephus bactrianus*), feral yak (*Bos grunniens*(E)), snow leopard (*Panthera uncia*(E)), leopard (*P.pardus*(V)), lynx (*Lynx lynx*), wolf (*Canis lupus*(V)), jackal (*C. aureus*), fox (*Vulpes vulpes*), otter (*Lutra lutra*), marten (*Martes foina*), and long tailed marmot (*Marmota candata*). The avifauna is the most diverse recorded in the Hindu Kush with 60 species identified. Ajar Valley is the largest tract of land in Afghanistan with a history of effective environmental protection. (Shank *et al.*, 1977)

### 3.6.3. Dashte-Nawar Waterfowl Sanctuary

In southeast Afghanistan in Ghazni Province, Dashte-Nawar is an important breeding and feeding site for migratory waterfowl and waders, along with Ab-i-Estada. It is also an important archaeological site, exhibiting intact stratigraphic sequences. Several mounds representing early dwellings have been discovered with accompanying artefacts which suggest occupations from Palaeolithic to Buddhist times. (Shank and Rodenberg 1977).

### 3.6.4 Pamir-Buzurg Wildlife Sanctuary

In the western Wakhan Corridor on the border with USSR in Badakhshan Province, the Afghan Pamirs are among the most spectacular landscapes of central Asia providing habitat for the famous Marco Polo sheep (*Ovis ammon poli*) along with seventeen other mammal species including ibex (*Capra ibex*). Carnivores include wolf (*Canis lupus*), red fox (*Vulpes vulpes*), brown bear (*Ursus arctos*), ermine (*Mustela ermina*), lynx (*Lynx lynx*), and snow leopard (*Panthera uncia*(E)).

The Afghan Pamir is one of history's greatest crossroads and migration routes for travellers. It contains valuable archaeological sites including petroglyphs probably dating to pre-Islamic times in the Wakhan Valley (Naumann, 1973) in addition to the well known sites in the Small Pamir. (Petocz *et al.*, 1987).

### 3.6.5 Bande Amir National Park

In the Hazarajat mountains of the western Hindu Kush, Bamiyan Province, the six lapus lazuli lakes of Bande Amir National Park are nestled between 300 meter magenta rock walls in the Bande Amir Valley. Their deep blue colour results from the water's purity and high lime content. This area is reported to be one of the most beautiful landscapes in Afghanistan, and has been a popular tourist attraction since the 1950s, with day tours operating to it from Bamiyan.

In 1978 it was reported that the area was becoming seriously degraded as a result of unlimited grazing, harvesting of reeds and uprooting of shrubs.

### 3.6.6 Kole Hashmat Khan Waterfowl Sanctuary

On the southeastern outskirts of Kabul in Kabul Province, Lake Hashmat was used as a hunting ground since Moghul times. In the 1930s King Mohammed Zahir Shah declared it a waterfowl reserve. As of 1978 there were over 30,000 migratory birds using the lake and 157 species identified. The lake lies in the Hindu Kush flyway and was a major staging ground for western Siberian waterfowl. It is the only remaining waterbody and marsh area of the formerly expansive marshland of Kabul.

Prior to the war the lake was threatened by pollution in the Logar River, grazing of domestic animals, cutting of reeds, indiscriminate shooting of birds, water diverted for irrigation and laundering of clothes in the lake. Since 1979 the area has been restricted for security reasons and management activities have not been sustained. (FAO, 1980)

The high number of waterfowl available in the markets in Kabul would indicate that indiscriminate shooting of waterfowl from Lake Hashmat continues in 1991.

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It is feared that many of the original values of these six major protected area candidate sites may have been lost. Field workers estimate that the most severely damaged areas are likely to be Kole Hashmat Khan because of its close proximity to Kabul, and Bande Amir National Park, with its high density of human settlement. Ecological values are likely to be intact in Pamir-Buzerg National Park due to its relative isolation in the Pamirs. However one cannot be sure of this until field visits are made to all of these sites. Staff from FAO Islamabad and the International Convention on Wetlands and Waterfowl (Ramsar) have expressed interest in assessing the critical wetlands of Ab-i-Estada and Dashte-Nawar when the security situation permits access to these areas.

# 4. IDENTIFICATION OF ENVIRONMENTAL ISSUES AND OPPORTUNITIES IN AFGHANISTAN

Without exception, all persons interviewed said that the prolonged war has had a devastating effect on the environment in Afghanistan: there has been a direct net loss of natural resources (natural capital). On the other hand, there may be small gains made in regeneration of areas of high summer pasture now inaccessible due to mines and in isolated wildlife habitat areas temporarily cut off from hunting pressure.

However, war should not be seen as the sole cause of environmental degradation in Afghanistan. Environmental problems such as deforestation and over-use of marginal agricultural and pastoral lands were cited to be problems prior to the war. In addition, wildlife species were hunted to extinction long before the war. (FAO 1978, Petocz 1989) Therefore the war should not be seen to be the single cause of Afghanistan's current environmental problems, rather it has accelerated already established negative trends in resource use.

This is not to understate the effects of war, for there is no doubt that in the areas of the country reported to be the hardest hit by war, such as Kandahar and Herat, the net loss of natural resources (forests, productive land, access to water resources) has been devastating. (Mission reports, field worker interviews.)

Based on our consultations with UN agencies, NGOs and government officials, our review of project documents and our field visits, the following environmental issues have been identified as having a negative effect on the sustainability of the resource base of Afghanistan. Where possible we have tried to address specific environmental management problems that can practically be addressed in light of the current political and military situation in Afghanistan. Undoubtedly some of the environmental problems raised, such as watershed management, are difficult to tackle in light of current circumstances of war.

## 4.1 FOREST RESOURCES

### 4.1.1 Deforestation

With only one exception all UN agencies, NGOs and government officials indicated that the loss of forest resources, including natural forests and plantation forests, is the major environmental problem facing Afghanistan.

With the commencement of the war in 1979, denudation of the natural forest cover of Afghanistan has accelerated. A 1981 UNDP/FAO report states

> ... the few remaining forest areas of the country are being destroyed at an alarming rate to meet the fuel needs of the major cities. Large scale charcoal production has destroyed the extensive *Juniperus* woodlands of northern Afghanistan. Fuel for Herat is taken from the *Pistacia-Amygdalis* forests of Dari Wakhal and the mountains north of Anaedarre. The *Quercus baloot* and coniferous forests of Paktia and Kunar province are exploited to provide fuel for Kandahar and Kabul and the Jalalabad basin. (UNDP/FAO, 1981)

According to a World Bank report of 1978, 10 times the sustainable yield of timber was extracted from these areas each year. (UNDP/FAO, 1981)

Historically, the provinces of Paktika, Paktia, Kunar and Nuristan had rich natural forest cover with valuable species such as oak, cedar, ash, willow, pine and spruce. The valuable nut-bearing pistachio forests of the northeastern and central provinces are known internationally for their productive and high quality pistachio nuts.

Forests have been cut down without consideration to their ecological, environmental and economic values. Mission reports have cited pistachio forests being cut for firewood and old growth cedar forests of the eastern provinces being cut for the lucrative timber trade in Pakistan. The Mission observed that the new roads opened in Kunar for agricultural and other development purposes have facilitated this trade in valuable timbers from the eastern provinces to Pakistan and the Middle East. It has been reported that up to 50 to 60 truckloads daily move out of Afghanistan as a part of this trade. (MADERA, 1990)

Destruction of the forests differs from region to region. In the war-torn southern and eastern provinces, trees have been an important source of income for landowners. Eighty five percent of the Afghan population depends on agriculture and a high percentage depends on wood for cooking and heating. Timber is also the predominant material in the construction of houses in the southern and eastern provinces. A shortage of construction timber due to the indiscriminate felling of trees by the military as well as inhabitants in the regions, is one of the biggest problems faced by reconstruction programmes in the provinces of Kunar, Nangahar, Paktika, Paktia, Kandahar and Zabul. With the repatriation and re-settlement of refugees, the demand for wood is increasing and urgent measures will be needed to meet their demands, either through available forests or alternate sources, and to protect what remains of the natural forest cover of Afghanistan.

There is a tradition, and therefore a precedent, of commercial tree planting by small landowners in Afghanistan. Poplar, known for its many uses as fuelwood, construction timber and the manufacture of household furniture, has been a dominant species among planted forests. The Ministry of Agriculture/FAO project reports that the fast-growing

poplar can be established in 26 of the 29 provinces of Afghanistan, in areas with adequate water supply. Poplar plantations are currently found along the irrigation channels and other waterways, however the war has resulted in the damage and neglect of these irrigation systems which ultimately has resulted in the destruction of the poplar plantations. In addition, the displacement of farm populations due to the war and their subsequent migration to neighbouring countries as refugees has resulted in the neglect and/or the cutting down of these trees.

### 4.1.2 Erosion and Desertification

The effects of this accelerated deforestation process is seen throughout Afghanistan. The barren hilltops around Kabul and Faizabad, where topsoil has been washed away exposing bedrock, is an example of this damage. Government officials and project field workers indicated that prior to the war the forest cover on the hillsides surrounding Kabul was substantial.

Erosion of fertile top soil has effected agricultural programmes as well. The land is badly degraded and the recent heavy flooding in the western parts of Afghanistan may be a direct result of the denudation of the forest cover. Not only has the soil eroded, but heavy boulders have been washed downstream, blocking and damaging irrigation systems. Denudation has progressed to desertification in many areas where reclamation of once-productive areas may be impossible.



*Village in Faryab Province* Photo: Don Meier S.C.A.

### 4.1.3 Present Forestry Programmes

Before the war, there were two energetic forestry programmes in Afghanistan started by the French and Germans. Both these projects have been abandoned and the only ongoing programme within the country is the FAO/UNDP project for the strengthening of the Forestry Department which commenced on 1 February 1983 (AFG/82/003). This project was launched to assist in forestry planning and development and to support afforestation programmes with poplars and other fast-growing species through the Kabul government's organization. In 1986 it entered its second phase. The only noticeable progress under this project is the establishment of seven nurseries in Kabul as well as some limited establishment of forest plantations in the Kabul watershed.

UNDP/FAO have realized the importance of extending this programme to other provinces, particularly to the rural areas of Afghanistan. A revised project to be submitted to UNDP (AFG 86/011) proposes to extend its activities to six other provinces namely Nimroz, Balk, Herat, Badakshan, Samangan and Nangahar.

The revised project proposes to establish pilot nurseries in these additional provinces and improve the quality of seedlings and cuttings. Afforestation and reforestation in Kabul and the six provinces would be encouraged through the participation of local people. The objectives of the project are relevant to current needs, however if past results are any indication, the extension and training capacity of the programme needs to be drastically improved and new community and rural development partners (NGOs, village organizations) need to be found to carry out the extension work throughout Afghanistan. The Mission visited several FAO forestry nurseries in the Kabul area. While they appeared largely to be technically successful, there was little evidence in the city of Kabul of tree planting in housing areas, on hillsides, at schools or around public institutions.

The FAO cross-border programme operating from Islamabad, Peshawar and Quetta appears to be much more successful at united extension activities in the eastern provinces bordering Pakistan. It is regrettable that this programme is confined to limited cross-border activities

The Mission had the opportunity to meet in Peshawar the French NGO MADERA which is carrying out cross-border operations for the reforestation of the Kunar Province. It is not only an attempt to re-establish forest plantations but also an integrated forestry development programme. The programme is operated through the village shuras with community participation and appears to be a successful attempt to help the local communities and organizations manage their own forestry operations.

We were impressed with the integrated model of MADERA's forestry project which includes planting trees, preparing forest maps, training carpenters and constructing a small scale saw mill with a micro-hydro plant. The preparation of maps of forest stands is assisted by forest agents appointed for each village, thereby creating an awareness among the local population of the principles of forest management. Project staff do not attempt to prevent the people cutting down trees, instead they assist them in managing their forests scientifically. The trees to be felled are marked by the forest agents with the assistance of the owners, thereby gradually introducing principles of forest management. The training programmes for carpenters in wood production techniques introduce wood saving methods while project staff set up a small scale saw mill operated by micro-hydro.

UNOCA also has been advised of the need for an improved social forestry programme in a paper entitled *National Forestry Rehabilitation Program for Afghanistan* by Dr. Mohammad Alam, 1990.

## *RECOMMENDATIONS*

*Short Term*

**4.1.A** The Mission recommends that in the short term, existing forestry programmes place a much greater emphasis on *social forestry* and *agroforestry*. This implies requiring more community based results from current UNDP/FAO programmes through more effective extension programmes. It also means more linkages between UN and NGO forestry and agriculture projects. We reccomend that more NGOs and UN agencies consider the approach outlined in the 1990 report by Development Alternatives International (DAI) on *Agroforestry in Afghanistan.*, and that of MADERA s social forestry programme.

The Mission recommends that social forestry programmes include the following components.

(i) Planting in farming areas, hillsides, schools, mosques, courtyards and lanes. The proposed FAO Kabul Revised Project should establish linkages with agricultural and orchard establishment programmes to promote the planting of trees for hedges, building poles, fuel and watershed protection.

(ii) The species for use in agroforestry projects should be selected in full consultation with local people who can advise on indigenous species, cultural considerations and historical knowledge of the ecology of Afghanistan. We recommend that consultation with local people include consideration of these species suggested in the DAI 1990 study on agroforestry in Afghanistan:

- for hedges, Russian olive (*Eleagnus angustifolia*);
- for building poles, fast growing species such as white poplar (*Populus alba*) and black poplar (*Populus nigra*), tall species of willow (*Salix* sp.) and black locust (*Robinia pseudocaciap*), Hindustani bekiana (*Ailanthus glandulosa*) and eucalyptus;
- for fuel, branches and thinnings from plantations of black locust, Russian olive, ailanthus, mulberry and willow, as well as palosa (*Acacia modesta*) and ghoraski (*Dodonea viscosa*) at lower elevations;
- for erosion control, all the fuelwood species, especially the legumes, will protect the soil, along with native trees and grasses such as wild almond, Cercis and Artemisia;
- for timber, species such as Persian pine (*Pinus halepensis*) and cedar (*Cedrus deodara*).

(iii) Farmers, landowners, shuras, community groups, school children, teachers and religious leaders should be participants in social forestry through expanded extension and education programmes. Basic pamphlets and posters should be produced explaining the objectives of the programme and its benefits, and

# 1. BACKGROUND AND TERMS OF REFERENCE

This report summarizes the results of a Mission carried out by environmental consultants for the World Conservation Union (IUCN) under contract during February - April, 1991 to UNOCA, the Office of the Co-ordinator for United Nations Humanitarian and Economic Assistance Programmes relating to Afghanistan.

UNOCA conceived the Mission to ensure that the planning and implementation of Afghanistan projects pay adequate attention to critical environmental factors, both in the current short term emergency aid situation and during the transition to long term developmental assistance. In doing so, UNOCA recognizes that the successful rebuilding of Afghanistan ultimately depends on the sustainable use of the rangeland, wetlands, agricultural and forest resources that were the basis of survival for the peoples of Afghanistan prior to the War.

The Terms of Reference for the Mission (reprinted in Appendix A) require that the consultants propose

> ... a series of priority projects in Afghanistan for incorporation into the programmes of international agencies working in the country...

as well as

> ... environmental management measures which might be taken by these agencies to ensure that current programme and project preparation is undertaken with due regard to the requirements of sustainable resource utilization.

This report is intended to assist UNOCA, other UN agencies and non-governmental organizations (NGOs) in assessing the environmental management aspects of their project planning and implementation.

It should be clear from the outset that the Mission did not intend to evaluate or monitor projects. Rather, its terms of reference and scope sought an overview of the natural resource aspects of current and proposed projects in Afghanistan, as a step towards their support and enhancement. In addition, where no current projects met a specific environmental concern, the Mission was to conceive and propose new projects for consideration by UN agencies and NGOs.

Also, this document was not meant to include a National Conservation Strategy (NCS) similar to those strategies being produced in many developing countries throughout the world. Unfortunately, inadequate baseline data, the lack of a national institutional framework and the significant constraints of war render the development of an NCS premature at this time. We hope, however, that our work will contribute positively to a National Conservation Strategy when peace returns to Afghanistan.

The scope of this Mission has been limited to the environmental management aspect of

seedlings should be provided free of charge to those who are participating in the programme.

(iv) Farmers' woodlots should be established wherever possible. According to the present land tenure system, the average size of a plot of land is about 4.5 jerebs. Degraded land unsuitable for agriculture could be used for such a purpose.

(v) Farmers or the landowners will have to be drawn into this programme by way of incentives. Social forestry may not be an attractive investment to landowners because of delayed returns of five to 10 years, therefore a substantive motivating factor will have to be built into social forestry programmes. The experience in Afghanistan of utilizing food assistance programmes (Work for Food) for the renovation of irrigation systems and construction of roads and bridges can also be extended to farmers' woodlot projects and the establishment and maintenance of forest plantations.

(vi) Establishment of protective woodlots in environmentally critical areas should form a part of this project. The FAO/UNDP project and the DAI Agroforestry Report have identified the need to establish shelter belts/windbreaks to prevent the movement of sand dunes. Here again, those engaged in protective woodlot establishment should be employed through the Food for Work programme.

(vii) Forest products identified by DAI such as pistachio nuts, pine nuts, licorice from the root of *Glcyrrhizia glabra,* and *Asa foetida,* a gum used in flavouring curries from the umbelliferous *Ferula foetida,* should be protected and enhanced where possible for income generation.

**Forestry and Land Use Maps**

**4.1.B** The Mission supports the immediate commencement of the UNDP/FAO land use mapping project with the Institute of Cartography of the Ministry of Agriculture. This project will enable the Institute to use their cartography equipment to produce maps of pre-war land use and of current damage to land based resources which are both essential as planning tools for future natural resource programmes.

**4.1.C** The Mission recommends that selected agriculture and forestry project staff be given technical training assistance to produce basic maps of their project areas which will illustrate forest cover, condition of land, and other critical land/resource use information.

**Education and Extension**

**4.1.D** The Mission recommends that UNDP/FAO Kabul add a major extension programme to their forestry and agriculture programme. The Mission felt strongly that without a solid extension programme transfering the social forestry skills to people and areas in need, there is little point in continuing to support technical inputs to FAO Kabul. Furthermore, the Mission recommends that partners be found with specific expertise in community and rural development techniques to carry out this extension programme.

**4.1.E** The Mission recommends that the extension materials developed by MADERA

(posters, booklets) in its social forestry programme be examined for possible application in other social forestry programmes.

4.1.F Social forestry extension materials should be produced on a large scale and incorporated into multi-purpose extension centres and basic education centres throughout the country. (See Extension recommendations.)

**Watershed Management**

4.1.G The Mission recommends the establishment of a limited watershed protection programme linked closely to the social forestry programme and agro-forestry projects.

Short term objectives for the watershed programme could include identification of critical sections of watersheds; limited annual requirements for the planting of buffer zones of trees on critical slopes; strategies for control of livestock in critical areas; mapping of forest and agricultural resources in critical watersheds; and identification of new forestry projects for long term watershed protection.

**Alternatives to Timber**

4.1.H The Mission recommends that support be given to the expansion of successful programmes promoting fuel efficient cookers, communal baking systems, training for bakers, compressed brick manufacturing, dome construction techniques, solar energy technology, micro-hydro enterprises, biomass and other wood substitute/energy efficient strategies.

4.1.I The Mission recommends that wherever possible wood substitute/energy efficient technology should be promoted extensively by UN agencies through the project planning and approval process. Projects that are wood intensive should not be funded if appropriate wood substitute technology can be developed in the region.

4.1.J Technical exchanges between projects, UN agencies, NGOs and local villages should be promoted to demonstrate advances in wood substitution.

*Long Term*

**Protection of Natural Forests**

4.1.K The Mission recommends that in addition to the short term strategies stated above, an attempt should be made to protect the remaining natural forests in Afghanistan. Representative areas should be selected initially in areas where security conditions permit such management.

4.1.L The Mission recommends that the clearing of mines from selected key areas of natural forest begin when objectives for mine clearance near settlements have been achieved, and that planning for the preservation of the remaining natural forests should commence as soon as the security situation allows.

**Rangelands**

**4.1.M** The Mission recommends that an assessment of the carrying capacity of existing rangelands be carried out as soon as it is practical, and that the results be used to determine whether rangelands can sustain increasing livestock populations or not. The results should be used to develop rangeland management plans, including the assessment of the implications of livestock support programmes such as the veterinary vaccination programme.

## 4.2 AGRICULTURE

### 4.2.1 Management of Agrochemicals

Afghanistan is primarily an agrarian country. Seventy-eight percent of the 1989 GDP of Afghanistan was attributed to agricultural production and reports claim that agriculture provides livelihood for four-fifths of the population. (UNDP, 1989)

The Government has indicated in the 1989 Development Cooperation Report that one of its major priorities for the 1990s is to restore the agricultural sector through programmes of rehabilitation and repair of damaged structures, provision of inputs and extension services.

Inputs in the form of agrochemicals (fertilizers, insecticides, fungicides and herbicides) are being used currently to begin to meet the demand for increased yield/food production within Afghanistan. More chemical inputs will be needed as an increased emphasis is placed on improved seed production. Current levels of fertilizer use are not excessively high, mainly because of the limited supply of fertilizers, particularly of the phosphate type.

Although there are other methods of controlling pests and crop diseases -- such as regulatory, cultural, biological, physical and mechanical means -- their use is currently minimal in addressing agricultural pest and disease problems in Afghanistan. Use of chemicals has been the method of choice to date.

While the Agrochemical Working Group of ACBAR has published a list of recommended agrochemicals for use in Afghanistan and guidelines for their use, the exact range of chemicals being used in Afghanistan is unknown since there is no internal control on their import.

NGOs, UN agency staff and government personnel interviewed expressed the concern that the handling, application, storage and transport of agricultural chemicals, particularly pesticides, poses an environmental management problem now, and an even greater one in the future if inputs are to be increased in coming years.

A recent shipment of Chlorophos (Diptrex) arrived in very poor condition and was refused entry by USSR customs at Termez.

Of particular concern to many NGOs and UN staff is the use, storage and transport of BHC -- a highly persistent contact chemical provided by the Soviet Union for use in eradicating locust in the northern provinces of Afghanistan. The chemical is in powder form and is applied by hand sprinkling on affected wheat crops, in a concentration of one part BHC mixed with four parts soil. The chemical is packaged, transported and stored in *paper* bags which are highly susceptible to breakage. Manufactured in India, BHC is banned in all countries including the Soviet Union because it can bioaccumulate in organisms, and it has been suspected of causing several forms of cancer. It appears that the Soviets have dumped relatively large quantities of BHC in Afghanistan as a contribution in kind under the Soviet Afghan Development Agreement. A DAI document (1989) states that the problem with the use of BHC is critical enough that every effort should be made to rapidly eliminate its use.

According to FAO and the Ministry of Agriculture Plant Protection Department in Kabul

there are approximately 7,000 metric tons (mt) of BHC in Afghanistan stored in five locations:

| | | |
|---|---|---|
| Mazar-i-Sharif | 2,039 mt | (in two storage locations) |
| Pul-i-Khomri | 2,933 mt | |
| Aibak | 278 mt | |
| Kunduz | 693 mt | |
| Khulm | 400 mt | |

Seven hundred metric tons of the Mazar-i-Sharif BHC was shipped to local villages in April 1991 to replace the chemical Sumi Combi Alfa, a safer pesticide alternative to BHC, which unfortunately did not arrive in time for the spring locust control programme.

A Mission member visited two of the storage sites for BHC in Mazar-i-Sharif and reported that many of the paper bags containing the chemical have broken, resulting in powdered BHC being blown around the site. One storage site is a mud-walled compound with no doors; in it, the paper bags (including broken ones) are exposed to wind, rain and unsuspecting passersby. The compound entrance does have a door which, at the time of the visit, appeared to be locked. The second warehouse appeared in reasonable condition with a solid roof and locked door. The stench of BHC outside both warehouses was overwhelming.

The storage conditions of BHC in the other four locations is unknown to the Mission. Reports were received by the Mission of BHC being sold in bazaars -- stacked next to food products and other household goods.

FAO, UNDP and NGOs are aware of the hazards of BHC and have tried to eliminate its use by the 1990/91 Locust and Sunn Pest Control Program by obtaining a substitute chemical, Fenitrothion whose trade name is Sumi Combi Alpha. However, due to the late arrival of the Sumi Combi Alfa chemical, BHC will have to be used again in this year's locust programme. This leaves Afghanistan with approximately 6,300 mt of BHC, plus problems related to changes in BHC's chemical composition over time, and what to do with present poorly packaged stores of the chemical. BHC was being rebagged at one of the warehouse sites in Mazar-i-Sharif, however the workers were not using respirators while they worked with the powdered chemical.

Ministry of Agriculture (PPGD) staff involved with the Crop Protection Program, FAO, the Swedish Committee and UNDP indicated that there seemed to be three options for the remaining BHC: use it under controlled conditions, transport it back to the Soviet Union for disposal or dispose of it on-site using a high temperature kiln. A fourth option of forgetting about it was not considered to be responsible by those interviewed, especially in light of the instability of the paper bags.

Several persons interviewed from DACAAR and the Swedish Committee were also concerned that since one of the major long term objectives of the programme is to move away from the use of pesticides to changes in agricultural practices, the use of BHC was a retrogressive step. Concern was also expressed that even if BHC is used at a rate of 700 mt or 1 000 mt per year, safe storage, transport and application of the chemical will be problems for at least another five to 10 years, given the existing supply. No one knows what happens to the chemical composition of BHC over extended periods of time.

A Mission member also participated in discussions with the training staff for the Northern Afghanistan Crop Protection Project in Mazar-i-Sharif. This is a project to train crop protectionists in the application of BI58 liquid insecticide using new ULV sprayers. While it appeared that the trainers were doing an excellent job, the protective equipment necessary for crop protectionists and village people was less than complete. No goggles, poor quality and an inadequate number of rubber gloves were observed by the Mission. Some interviewees expressed concern that if toxic chemicals were to be supplied to local people at a cost of several million dollars, adequate protective equipment should be supplied as well.



*Crop protection workers spreading powdered pesticides in Badghis* Photo: Don Meier, S.C.A.

Several interviewees pointed out that there is no Afghan organization in place to monitor the exposure of humans to pesticides. DAI, in its spraying programme to control locust with malathion, proposes to provide field test kits for routine monitoring of whole-blood cholinesterase levels in those exposed to pesticides in the course of the programme. The kits are designed for use in harsh field conditions by technicians with minimal training. The use of the kits will allow staff to screen workers for cholinesterase inhibition by malathion, and thus to prevent potential cases of chronic pesticide poisoning.

NGOs also mentioned to the Mission that they have come into contact with farmers who have agrochemicals in their possession but no protective equipment or sprayers for use

while handling and applying them. In addition, the labels on the chemical containers are often in a language foreign to Afghan people, with the result that farmers without access to agricultural extension services are unaware of the proper use of the chemicals.

The Agrochemical Working Group of the Agriculture Sub-committee of ACBAR is well aware of both the advantages of and problems associated with the use of agrochemicals. The Working Group has prepared an excellent list of guidelines/standards for use of pesticides in projects undertaken by ACBAR members in Afghanistan. These guidelines appear in Appendix D.

## *RECOMMENDATIONS*

Given the reality of the agricultural situation in Afghanistan and the urgent need to increase food production within the country, the Mission recommends the following with respect to the management of agrochemicals.

***Short Term***

**4.2.1.A** That alternatives to chemical management such as regulatory, cultural, biological, physical and mechanical means of pest and disease control be required by funding agencies as a component of appropriately selected agricultural programmes.

**4.2.1.B** That these alternatives be promoted extensively through education programmes, technical exchanges and extension work.

**4.2.1.C** That UNDP/FAO hire a chemical expert on a short term consultancy to prepare a long term management plan for the use, storage and transport of existing BHC stocks, and that sound technical advice be communicated to all parties currently in contact with the chemical (extensionists, project staff, local people).

**4.2.1.D** That all efforts be made to encourage the Government of Afghanistan to refuse any further shipments of BHC from the Soviet government and possibly to consider sending the remaining BHC back to the Soviet Union, provided alternative chemicals are available.

**4.2.1.E** That UN agencies provide for the timely delivery of agrochemicals for next season's Crop Protection Program, and that these chemicals be of an acceptable quality for use in the programme.

**4.2.1.F** Concommitant with the timely delivery of appropriate chemicals, that adequate safety/protective equipment be made available for use by crop protectionists in the application of the chemicals.

**4.2.1.G** That all projects using agrochemicals potentially harmful to humans include an environmental health testing and screening component, either through the use of field test kits or by teaming up with a health-related NGO which can provide the service.

**4.2.1.H** That an education programme be designed including posters, booklets, labels printed in Dari and Pushto (for use with imported chemicals), and other appropriate materials on the use of agrochemicals. These materials can be used by extensionists to reach

farmers with chemicals in their possession but poor knowledge of their use.

*Long Term*

4.2.1.I That this education programme become part of a larger agriculture and forestry extension programme designed to train multi-purpose extensionists. (See also Extension Recommendations.)

4.2.1.J. That technical assistance be provided to the Ministry of Agriculture to assist in drawing up regulations controlling the import, transportation and marketing of agrochemicals.

### 4.2.2 Waterlogging and Salinity

Although water and irrigation projects were not in the scope of our Mission, we were encouraged to consider environmental problems related to waterlogged areas of Afghanistan. UNICEF Kabul pointed out to us the major health problems caused by flooded, waterlogged and stagnant bodies of water in Helmand and southwestern Afghanistan, which include malaria among other water-borne diseases. Reducing the waterlogged areas, they feel, would result in a major improvement in the health of the people.

We were not able to obtain figures on loss of productive agricultural land due to excessive waterlogging and increased salinity, however project field staff indicated this was a significant problem in certain parts of the country such as Helmand. Waterlogging and salinity is also a problem in Pakistan and parts of Indonesia, however work has been done there to introduce saline tolerant vegetation which has helped to dry out the affected areas as well as stabilize soils for the production of fodder crops.

Although the Mission was not able to visit any of the waterlogged areas, we would encourage agricultural based projects in these regions to explore any possibility of providing saline tolerant species of grasses and other vegetation to area farmers or of proposing basic drainage schemes that recognize the value of wetland areas.

*RECOMMENDATION*

4.2.2.A The Mission recommends that agricultural projects in waterlogged areas explore the possibility of providing saline tolerant species of grasses and other vegetation to farmers, and of devising appropriate drainage schemes. The value of natural wetlands should be kept in mind at all times.

Other options can be explored using examples from Pakistan and South Asian countries.

### 4.2.3 Apiculture

According to an FAO report by Dr. C. Zmarlicki, Afghanistan has a history of beekeeping that goes back for centuries. It is still common in Nuristan, Kunar, Nangahar and Paktia where hives are found in clay pots and logs in the mud walls of houses. There were 700

beekeepers with 45,000 colonies of bees in 1976, however in 1979 bee colonies suffered from ectoparasitic mite infestation which destroyed about 90 percent of the colonies.

Prospects are still excellent for the development of apiculture in Afghanistan as an additional source of food and revenue. There are also substantial benefits to be gained for orchard pollination. In a time of food and cash shortage, this presents a very beneficial opportunity.

FAO reports that as a hilly, agricultural country, Afghanistan has a great potential for honey production. Excellent agro-climatic conditions ensure that plants produce an abundance of nectar and pollen, and the variety of climate conditions in Afghanistan produced by variations in altitude is important for bees since vegetation at lower altitudes starts blooming earlier than at higher altitudes. Bee colonies can therefore be moved from one place to another, making use of two or three nectar flows from the same plant species.

Poplars, willows, maples and acacia as well as cultivated fruit trees like almonds, peaches, apricots, plums, cherries and apples plus species of clover, alfalfa, sunflower, rape and corn all offer excellent nectar and pollen. In the warm provinces of Nangahar, Paktia, Laghman and Kandahar citrus, loquat and eucalyptus trees excellent for honey are cultivated.

Zmarlicki estimates that the value of increased crop yield due to bee pollination is 25 to 143 times the value of honey and beeswax produced. Another advantage of beekeeping to Afghanistan in its current circumstances is that it is an excellent productive activity for landless people. Hives can be located and tended in orchards and fields belonging to others yet produce significant revenues for landless people.

*RECOMMENDATION*

**4.2.3 A** The Mission recommends that where possible and in locations suitable for apiculture, orchard and agroforestry projects should try to add a bee-keeping component to their projects to provide increased pollination and revenue from honey and beeswax.

### 4.2.4 Aquaculture

The Mission visited the UNDP/FAO Rainbow Trout Fish Farm at Qargha Lake outside of Kabul. From the FAO Progress Reports on the project, it appears that the rainbow trout has done extremely well biologically. The report states that

> ... the project has made excellent technical progress. The current stocks of trout at Qargha are considerable larger in both number and weight of fish than the targets set out in the project document. Mortality of fish has been negligible, and recent sampling indicates a stock of more than 80,000 fish averaging around 70 g. The fish are in fine condition and healthy. (FAO, 1989)

Problems encountered by the project have been related to the ongoing security situation around Kabul as well as the lack of supply of necessary inputs such as fish pellets and cage nets. The project had planned to use floating cages in Qargha Lake, but it proved too risky to do so due to fighting in the immediate area.

Inputs generally required for the project are minimal, however, and not particularly costly. (20,000 kg fish pellets cost $25,000 and last for two years). The staff maintaining the fish farm at Qargha Lake appears to be capable and functioning well under adverse circumstances. The potential for the expanded development of fish culture in Afghanistan both in cold and warm fresh waters appears excellent, with plans to provide fingerlings in 1991 to Bande Amir, Baghlan Chashma Shier Farm as well as Qargha Lake. (FAO, 1989)

An additional problem concerning the demand for the trout from the project was mentioned to the Mission by UN staff. In the past, trout have apparently either been eaten by diplomats or the military, and few have filtered through to local people. This is a marketing and distribution problem, not a biological or technical one. The Mission would urge FAO to undertake a marketing strategy for the fish aimed at the population it hopes to service with the project. It would be unfortunate to lose the nutritional and economic benefit of a sound biological project like fish culture, because of an inadequate marketing strategy. In a country with major food deficits, problems of malnutrition and a lack of revenue-producing enterprises, fish culture presents positive opportunities to meet many needs on a small scale.

*RECOMMENDATIONS*

**4.2.4.A** The Mission recommends that the Qargha Lake Rainbow Trout Fish Project continue to be supported, and that when the security situation allows, the stock be extended to other biologically suitable fresh water bodies in Afghanistan.

**4.2.4.B** The Mission recommends that a marketing and distribution strategy be developed for specific target populations, so that the trout will provide not only revenue but also supplementary protein in the diet of the people of Afghanistan.

projects involving natural resources such as forests, agricultural land, water and renewable energy, and to geographical areas of specific ecological importance such as wetlands and wildlife habitats. Areas deemed to be outside of this study include projects related to non-renewable natural resources such as minerals, oil and gas, as well as the physical planning aspects of water and irrigation projects.

Without exception, project staff from UN agencies, NGOs and ministries in the Government of Afghanistan were most generous and cooperative in giving us their time, information and assistance. We are especially grateful to Mr. Martin Barber, Chief of UNOCA Mission, Islamabad and Mr. Antonio Donini, Deputy Chief of Mission, UNOCA, Kabul for their assistance and guidance. Mr. Tahir Babar, Assistant Program Officer, UNOCA, acted as facilitator for our work, and Mr. Jon Bennett of ACBAR, Peshawar assisted us in organizing a meeting of Peshawar-based NGOs to discuss environmental issues and to review our recommendations. We are grateful for this assistance and we hope that our recommendations will be of assistance in future project planning and implementation in Afghanistan.

## 4.3 ENERGY ALTERNATIVES

The lack of energy options for industrial, commercial and household use is evident throughout Afghanistan. Trees are being cut at an alarming rate for firewood which in turn is used for heating and cooking. Electricity shortages in major centres occur daily. While this report does not propose to address energy options for the industrial and commercial sector, one cannot overlook the links between increasing deforestation, loss of productive soil and the urgent need for alternative energy options for household use.

In 1989/90 it was estimated that the population of Afghanistan is 17.6 million, of which 84 percent lives in rural areas, and the remaining 16 percent in urban centres. Rural populations are heavily dependent on firewood for heating and/or cooking. In the eastern provinces wood previously reserved for construction is now being cut for fuel, and in the northwest provinces natural pistachio forests are reportedly being cut, also to serve as fuelwood. Even small bushes are used for firewood in some areas, thus accelerating soil erosion. In areas of marginal land, cow dung and agro wastes that could provide valuable fertilizer to depleted soils are often used as fuel to supplement scarce wood supplies. (ESCAP 1991)

Alternate fuels used for cooking and heating are diesel, coal and kerosene, propane (LPG) and electricity. Kerosene and LPG are imported in very limited quantities, and kerosene is also in demand for lighting where electricity is not available. Coal also is used for heating, however it is currently being produced in relatively small quantities only -- 140,000 tons compared with a total potential of 500,000 tons. Because of the security situation the distribution system for coal is poor and unreliable. Natural gas has been a major export in the past and it is used to generate electricity in Mazar-i-Sharif, mainly for the fertilizer plant. Two projects are planned in the near future for natural gas distribution to households. (ESCAP 1991)

The Mission visited the UNDP Renewable Energy Project in Kabul and was impressed with its technical advances and the enthusiasm of its staff. The project identifies biogas, micro-hydro, solar and photovoltaic technology as appropriately suited for energy development in Afghanistan. It is producing small solar hot water collectors, suitable for low income families, which could contribute significantly to improved health conditions as well as to less pressure on fuelwood supply.

The project reports that 150 sites are suitable for micro-hydro throughout Afghanistan, and the Mission has noted that micro-hydro is suggested in a number of other Mission reports (UNOCA, Eastern provinces, 1990). It is not known whether an environmental assessment has been carried out at any of these sites. Wind power seems less hopeful in that the project reports that wind is not constant, and further, it does not occur where the energy is needed.

The development of biogas digestors using agricultural and human wastes, on both a small and large scale, is reported by UNDP to be possible. The project has proposed the development of larger scale biogas projects in institutions, hospitals, schools and military camps, as well as smaller scale development of biogas digestors for use on cooperative and individual farms. The project reports that the Mazar-i-Sharif area could be used for a pilot project since the area contains approximately 100,000 cows in total, with smaller farms having approximately 10 cows each. Biogas development would alleviate deforestation,

erosion and the loss of productive soils as well as the pollution from human and animal wastes which causes major health problems in Afghanistan.

The Mission was also impressed with the GTZ Peshawar Domestic Energy Demonstration Centre where fuel efficient stoves are being produced, communal ovens are being developed and bakery training is taking place. In addition the GTZ Mason Training Centre has built an impressive training facility using compressed bricks and traditional dome construction. The project estimates that it takes 357 mega joules of energy to produce one cubic meter of compressed brick, compared with 3,500 mega joules of energy to produce one cubic meter of burned brick.

## *RECOMMENDATIONS*

### *Short Term*

**4.3.A** That wherever possible UN agencies should fund and promote projects that emphasize the substitution of wood through energy efficient technology such as solar energy, micro-hydro development, fuel efficient stoves and compressed brick construction. The Mission supports the expansion of the UNDP Renewable Energy Project and the energy efficient projects of the GTZ, SERVE and other NGOs which focus on energy efficient technology.

**4.3.B** That workshops on energy efficient technology be organized for NGOs and UN project staff for the purpose of keeping field workers and agency staff up to date on successful applications of renewable energy technology in developing countries, particularly those in south Asia and Africa.

**4.3.C** That an exchange be organized between the project staff of the Kabul-based UNDP Renewable Energy project and the Peshawar/Quetta based NGOs currently involved in energy efficient technology.

### *Long Term*

**4.3.D** That energy efficient practices become part of an extension training programme for local people, focusing on such topics as efficient wood use in carpentry, use of improved stoves and wood substitutes for building.

## 4.4 WILDLIFE AND PROTECTED AREAS

As the documentation on fauna and protected areas indicates in Section 3.5 and 3.6, there has been an impressive list of species throughout Afghanistan recorded in the past. Species such as the famous Marco Polo sheep (*Ovis ammon poli*), ibex sheep (*Capra ibex*) and the snow leopard (*Panthera uncia* (E)) are but a few of Afghanistan's well known mammals; other famous species are the rare Siberian crane (*Grus leucogeranus*) and the greater flamingo (*Phoenicopterus roseus*).

It is impossible to obtain an accurate estimate of current wildlife populations due to restricted access to important wildlife habitats. From the descriptive accounts of field workers and village project workers, it is feared that the increase in firearms as well as hunger and poverty resulting from the war has accelerated indiscriminate killing of wildlife for food and money. Falcons and other raptors have been captured and sold for Arabian falconry purposes. It is reported that birds such as the rare Siberian crane *Grus leucogeranus* have been captured in Bannu, south Waziristan, where there is a traditional trade in cranes as domestic pets and watch dogs. (FAO, 1990)

Occasional wolf and fox sightings are mentioned by villagers and in Mission Reports, particularly in the mountainous areas of the northeast. A quick perusal of the Kabul fur shops indicated that substantial numbers of wolf and fox pelts along with less numerous pelts of snow leopard, leopard and even baby leopard are available for sale. Strings of ducks and other waterfowl are frequently seen in the market in Kabul implying that the indiscriminate shooting of birds continues. Since hunting pressure has been an increasing problem for the past several decades (as reported in FAO reports of 1977 and 1973), the war cannot be blamed for the entire decline of wildlife populations.

Some field workers speculate there may be hope that some wildlife habitats temporarily cut off from hunting pressure by mines and heavy fighting may provide a temporary sanctuary for remaining species, thus allowing some populations to increase. However it is feared by most of those interviewed that, once peace returns to Afghanistan, species such as leopards and ibex sheep are doomed to extinction, if no stringent regulations are put in place.

In the six major protected area candidate sites identified in this report, it is feared that many of their original values may have been lost, particularly in those areas close to war activities such Kole Hashmat Khan Waterfowl Sanctuary and Bande Amir National Park.

Although cultural sites were not included in the TORs of the Mission, we received reports from field workers of local villagers excavating archeological sites of historical importance in Shaq and Langar for gold and any artefacts perceived as having monetary value. (Comnas, pers com.) This was regarded by the Mission as a great loss to the historical record of Afghanistan, and as such should be mentioned in relation to protected sites.

*RECOMMENDATIONS*

*Short Term*

**4.4.A** Villagers tempted to sell valuable artefacts and destroy archaeological sites in the

process should receive assistance to either gather and retain the artefacts, or to have them stored in a safe location.

*Long Term*

**4.4.B** When the security situation allows, a consultant with experience and expertise in the protected area sites of pre-war Afghanistan should be hired to assess the damage to identified protected candidate sites including sites of ecological and cultural significance. (See reference section of the Directory of Protected Areas, World Conservation Monitoring Centre, Protected Areas Data Unit for names of individuals with expertise in protected areas. UNESCO could supply cultural heritage reference names.)

**4.4.C** Project models for the involvement of local people in the sustainable utilization of wildlife species should be examined with a view to maintaining and enhancing remaining wildlife species and areas of ecological and cultural importance. (Examples may be found in Africa with the Masaai in Kenya and the Shona and Ndebele in communal lands in Zimbabwe).

**4.4.D** Afghanistan should be encouraged to join the International Convention on Wetlands and Waterfowl (Ramsar) as well as the International Convention on Trade in Endangered Species (CITES).

**4.4.E** Cultural sites and artefacts should be assessed for their inclusion in a future system of protected areas and sites. (The World Heritage Site Program of UNESCO). Particular attention should be paid to the accelerated loss of artefacts of cultural and archival relevance to the history and culture of Afghanistan.

# 5. INSTITUTIONAL SUPPORT ISSUES

## 5.1 TRAINING AND EXTENSION SERVICES

The Mission was interested in the degree to which technical skills and advances in natural resource related programmes were being transferred to local villages and people in need. Particular attention was paid to projects related to agriculture, forestry and energy alternatives.

### 5.1.1 NGO Programmes

NGOs working cross-border from Quetta and Peshawar have had to develop a form of extension service for transferring skills and inputs into Afghanistan. To date, none has chosen to locate its operation on a full time basis within Afghanistan.

It appeared to the Mission that NGOs working cross-border placed a significant emphasis on the need to train trainers, thereby building up over time a core of experienced field staff within Afghanistan. This seemed to be the case for most agriculture projects, as evidenced by the impressive efforts of the Swedish Committee Extension and Research Program now actively working in 150 to 180 districts within Afghanistan. In the UNDP/SCA Crop Protection Program for 1990/91, 30 trained supervisors are each expected to train up to 20 people in the application of systemic and contact insecticides to control locust and sunn pest. The SCA Research and Survey Program has also trained extension workers in survey and data collection related to yields, crop types, farming systems and levels of inputs for the Agricultural Survey programme. DAI also has a large agricultural extension programme, however the Mission was unable to visit it due to the unavailability of DAI staff during the Gulf War crisis.

There are more NGO cross-border projects related to agriculture than to forestry management, largely due to the urgent need for increased food production. The NGOs delivering forestry projects (such as MADERA, IRC, SERVE and Save the Children) also place a significant emphasis on training, however often NGO forestry projects are confined to a relatively small geographical area, and the training of local people to their particular valley or district. MADERA, for instance, is doing an excellent job of training 27 forest agents in all aspects of forestry management in an area of Kunar Province, including the production of such training materials as booklets and posters.

At present the GTZ energy demonstration projects (involving improved stoves and ovens) and the solar oven project of SERVE are working with refugees and do not offer training cross-border. GTZ indicates that it is in the planning stages of a cross-border programme scheduled to begin after July 1991. The Masonry Training Centre of GTZ is an impressive training facility using appropriate and progressive technology of compressed bricks and traditional dome construction.

### 5.1.2 Kabul based projects

The Mission observed a distinct lack of effective extension work in Kabul based projects in forestry and agriculture. The UNDP Energy Alternatives Project (solar hot water heating units for low income households and institutions) appears to have made a limited but vigorous start at extension within the Kabul area and it has plans to extend production to Mazar-i-Sharif. While there appears to be technically competent staff working in agriculture and forestry projects, there also appears to be little action in transferring seedlings and technical skills to areas where they are needed.



***Solar collectors, Kabul*** Photo: Nancy MacPherson

The Mission visited several FAO forestry nurseries at Qargha Lake which appeared technically to be successful, however there was little evidence in the Kabul city area of tree planting projects in housing areas, schools, public institutions or on hillsides. Both FAO and the Ministry of Agriculture recognize the urgent need for an effective extension training programme to extend various facets of the forestry programme through Kabul and beyond.

The Mission observed that many projects had identical startup problems with training and extension work -- finding a facility, transporting people and locating basic training materials. These problems occupied significant time and added significant costs to each project. It is suggested that modest multipurpose training facilities in different regions

throughout the country would be cost effective and avoid duplication of expense and effort while providing a focal point for more multi-purpose extension training.

## *RECOMMENDATIONS*

*Short Term*

**5.1.A** That greatly increased emphasis be put on successful models of extension and training for natural resource based NGO, UN and government projects. In particular, we would recommend examining the MADERA model for integrated social forestry, and the joint Crop Protectionist Training Program of UNDP/FAO,SCA, DACAAR, Afghanaid.

**5.1.B** That closer links be established between agricultural and forestry projects in every aspect of project planning, design, implementation, training/extension and monitoring. This can be achieved either through direct expansion of existing projects, or through forging partnerships between NGOs and agencies with expertise in agriculture and forestry. Many NGOs indicated to us that they would prefer to specialize and not over-extend themselves, so they might prefer the latter option of strengthened partnerships.

**5.1.C** That UNDP/FAO Kabul add a major extension programme to their forestry and agriculture programme. The Mission felt strongly that without a strong extension programme to transfer the technical skills to people and areas in need, there is little point in continuing to support technical inputs. Furthermore, the Mission recommends that partners be found with specific expertise in community and rural development techniques to carry out this extension programme.

*Long Term*

**5.1.D** That modest multipurpose extension/training centres be established in regions throughout the country to provide a physical setting, food and shelter for trainees enrolled in a variety of different programmes.

## 5.2 BASELINE DATA AND MAPS

Most of the people interviewed by the Mission cited the dificulty of planning and delivering natural resource based projects and programmes when using extremely limited and outdated baseline data and maps. While most project staff cope admirably well with the data they can find from Missions, many claim that, with a view to longer term development objectives, some straightforward system of recording data and information on the resource base of regions should be designed and implemented for all people to use. Even if the data collection is slow, at least it will be incremental.

The Agricultural Survey compiled by the Swedish Committee is an excellent start in this direction, however since it is limited to the agricultural sector it does not contain integrated and useful resource information such as extent of natural forests, plantations and fuelwood consumption.

Transferring resource and land use information to maps is also urgently needed as a tool for longer term development plans and the making of natural resources assessments. In its integrated forestry management project in Kunar, MADERA is attempting to prepare forestry maps for the areas in which it is active. MADERA indicated, however, that it was difficult for training project staff to prepare maps. DAI also has a mapping project, which unfortunately the Mission was not able to visit.

The Mission visited the remnants of the Mapping Department in the Ministry of Agriculture in Kabul. From a large cartographic unit in the 1960s and 1970s with a substantial capacity to make and produce maps, it has shrunk to several people using aerial photos and two stereoscopes to produce handdrawn maps of pistachio forests, vegetation and nomadic land use patterns.

FAO and the Ministry are currently planning a mapping project using remote sensing techniques (LANDSAT) which will be crucial in accurately assessing the extent of damage to land and resources. DAI and USAid are also undertaking an extensive mapping project, however it was unclear to the Mission if or how the remote sensing project of FAO and the USAid mapping project were coordinated. DAI staff were not available for interviews during the Mission's work due to the Gulf War. The question of duplication of projects and funding was raised by several interviewees.

*RECOMMENDATIONS*

*Short Term*

**5.2.A** That a modest system of data collection be designed for all natural resource based projects, with an emphasis on the collection of data related to the extent and status of the resource base of the country.

**5.2.B** That the Swedish Committee be encouraged to extend its excellent data survey work to include information related to the use and extent of forest resources.

**5.2.C** That summaries and interpretations of the data collected be circulated widely for use in all NGO and UN project planning and assessments.

5.2.D That the current data be transferred to maps as soon as possible and that the ongoing production of land use maps becomes a priority for use in future development planning.

*Long Term*

5.2.E That appropriate project staff be encouraged to produce basic maps of the regions where they are working to illustrate various land uses as well as the resource and demographic bases. Workshops on basic mapping techniques should be given to assist project staff.

5.2.F That any duplication between the USAid mapping project and the FAO mapping project be eliminated, with a view to producing a coordinated series of maps.

## 5.3 ENVIRONMENTAL AWARENESS AND EDUCATION

Many people with whom we spoke indicated that there was an overwhelming lack of awareness of the environmental implications of poor resource use practices such as overgrazing and the overcutting of trees. On the other hand, some community and rural development specialists said they thought people knew the consequences but had no other alternatives at present.

The communication infrastructure of the country has essentially been destroyed by war. Radio transmission is non-existent throughout the country and television is extremely limited. This severely hampers public awareness campaigns dealing with environmental conservation.

Many schools have been damaged or destroyed in the war, leaving much of the country without a formal education system. UNESCO and the Ministry of Education in Kabul estimate that there is a total of 909,870 students through Afghanistan (305,609 female and 604,261 male). Conditions in schools are reported to be dismal, with a lack of basic education tools such as paper and chalk. Literacy rates are reported to be 30 percent for males, and five percent for females.

The mujahedin and Government have different policies on education with the result that in Government-controlled areas it is possible to introduce new education programmes for females, but the same is impossible in mujahedin areas. (Pers. com. Abu Ali, UNESCO, 1991) The situation in institutions of higher education does not seem any better. It is reported that university professors are very poorly paid and that research budgets barely exist.

UNESCO's priority is the establishment of village Basic Education Centres, undertaken at present on a cross-border basis from Quetta. The goal is 45 such centres, with the current introductory phase aiming at the establishment of four in the Kandahar Region. The Centres are to be mobile units initially -- until the region or village shows interest in making them more permanent. Currently, basic education workers are compiling four booklets to be used in the Centres and the subject of one of them is Environmental Conservation. UNESCO indicated willingness to receive input on this publication from parties or organizations with expertise in environmental matters in Afghanistan.

Another problem is the lack of experience that science teachers (both lower and upper school) have in using a field-oriented approach to teach subjects with relevance to environmental education.

While FAO Kabul stated that it would like to work with schools and educational institutions, we did not see any evidence of schools actively participating in forestry or fruit orchard programmes. The Mission visited a Kabul school and orphanage which was the first installation site for the UNDP solar hot water heaters. The school has fruit orchards and fields suitable for agriculture but they are currently not being maintained. The school principal indicated a willingness to participate in an agro-forestry programme with the Ministry of Agriculture and FAO.

The Mission also observed that the level of environmental awareness was not always as

# 2. METHODOLOGY

## 2.1 STUDY TEAM

The Study Team consisted of Ms. Nancy MacPherson, consultant in environmental planning, and Mr. B.K. Fernando, consultant in forestry management. Both members of the team were contracted by UNOCA through the World Conservation Union (IUCN) in Gland, Switzerland. Mr. Vitus Fernando, Head of the Asia/Pacific Programme for the World Conservation Union in Gland, acted as liaison with UNOCA, Geneva. Mr. Martin Barber, Chief of Mission, UNOCA, Islamabad, supervised the Mission while in the field.

## 2.2 CONSULTATIONS AND FIELD TRIPS

The consultants carried out a series of interviews in Geneva, Islamabad, Peshawar and Kabul with key UN agency staff and NGOs. In addition, field trips were undertaken to projects at Qargha Lake, Mazar-i-Sharif and Peshawar.



*Rainbow Trout Hatchery at Qargha Lake* Photo: Nancy MacPherson

high among some project staff as it should be given the commitment of the UN to sustainable development, and the availablity of UN information on environmental degradation and alternate solutions.

*RECOMMENDATIONS*

*Short Term*

**5.3.A** That more emphasis be placed on the development of environmental education materials for use in current training and extension programmes in schools as well as in Basic Education Centres (UNESCO) and Rural Development Centres (UNDP). Topics such as sustainable use of natural resources (forests, land and water), strategies addressing deforestation, use of agrochemicals and alternate agricultural practices can form the basis for practical educational materials focused on some of Afghanistan's environmental problems.

**5.3.B** That a series of workshops on environmental education be held for teachers in Afghanistan, using the existing curriculum as a starting point. Practical examples of science/biology field work can be developed, as well as proposals for projects that would involve schools in forestry and agriculture related projects. UNESCO should play a major role in the workshop series.

**5.3.C** That a series of workshops on aspects of environmental awareness be held for project staff (UN and NGOs). Topics for these workshops could include technical information on environmental conservation, environmental planning or global and regional environmental education. Project staff should be canvassed for their ideas and needs, and local staff should be used as resource people for the workshops.

**5.3.D** That NGOs and government based project staff participate in the activities leading up to UNCED -- the United Nations Conference on Environment and Development to be held in Brazil in June 1992.

*Long Term*

**5.3.E** That a mass public awareness campaign on environmental conservation be undertaken (via radio, television and/or newspapers) as soon as the security situation allows.

## 5.4 SHORT TERM PLANNING

Without exception, all UN agency and NGO staff interviewed indicated one of the major constraints to a more integrated, environmentally sound development programme in Afghanistan is the extremely short project planning/implementation horizon which characterizes the emergency aid situation. Many projects seem to have six months to one year to accomplish their objectives, with funding for further inputs and training uncertain after that time.

This poses particular problems for natural resource oriented projects which generally take incremental steps to the building up of a resource base. While the Mission recognizes the realities and problems of coordinating emergency aid to Afghanistan, we also feel that in the transition from short term aid to development planning, NGOs and UN agencies can take a slightly broader planning horizon by looking at integrated packages of projects, and projects which have an incremental effect on the regeneration of the resource base of the country.

*RECOMMENDATIONS*

*Short Term*

**5.4.A** Where possible given security and political considerations, the longest time frame possible should be given to projects oriented to natural resource development -- agriculture, forestry and energy alternatives in particular.

**5.4.B** More integration of natural resource programme components into agriculture, forestry and extension may assist in generally broadening the planning horizon. Concentrating projects in critical watersheds is an option that should be considered.

*Long Term*

**5.4.C** With an increased emphasis on long term development objectives for Afghanistan, natural resource projects should be designed as incremental parts of larger resource management plans (such as forestry master plans and land use plans).

## 5.5 INTEGRATED PROJECT PLANNING, LINKAGES AND EXCHANGES

Closely associated with the problem of short term planning is the lack of ecologically oriented linkages between projects and programmes. From an environmental or ecological point of view there are programme elements that must be interlinked if ecological and human environments are to survive and be sustainable. An example of such linkages would be the need to manage watersheds including forests, vegetation and wetlands while developing water and soil resources for agricultural purposes. Education and training is connected to all natural resource based programmes. The World Conservation Strategy and the subsequent National Conservation Strategies undertaken by 52 countries throughout the world are based on the interdependance and linkages so essential to basic survival and sustainable resource use. (IUCN, 1980, 1991)

While the Mission was greatly impressed with some projects of NGOs and UN agencies working cross-border and cross-line, we could not help but feel that a more integrated approach to project planning and more collaboration in the field would produce greater results. In other words, more partnerships between the various areas of expertise in organizations and agencies would lead to essential resource use linkages.

The Mission is aware of the coordinating mandate of both ACBAR and UNOCA and feels they have provided valuable coordination and communication. The types of linkages we are suggesting should be made at the pre-Mission stage and during the first days of project conception. Both ACBAR and UNOCA could play an important role in ensuring such coordination at these early stages.

Several NGOs indicated they felt there should be more integration in delivering programmes in the field, and they expressed an interest in teaming up with other NGOs with complementary skills and expertise. For example, one NGO specializing in agricultural development felt they should invite another NGO with forestry expertise to add a reforestation component to their current agriculture programmes. UNICEF Kabul expressed interest in adding a social forestry link to their nutrition programme through the development of courtyard orchards as part of their mother/child nutrition programme.

Beneficial linkages to external natural resource based projects are also a possibility. Links between NGOs in the Asia Pacific Region could provide a useful information and support network for Afghan NGOs. A core of UN Volunteers specializing in natural resources could be developed as well as linkages with organizations such as the World Wildlife Fund Volunteer Program and Operation Raleigh. These would provide additional natural resource expertise and could develop extension materials. Such volunteer programmes do not necessarily have to operate in risky security situations.

The Mission was also concerned that there was very little technical exchange between Kabul based UN agencies and Peshawar based agencies and NGOs. While we understand that the political situation is highly sensitive and complex, we feel that technical exchanges would be extremely useful for all parties. We felt this would be particularly helpful in the areas of alternate energy demonstration where there are Peshawer based projects and Kabul based projects working with similar technical approaches.

## RECOMMENDATIONS

*Short Term*

5.5.A That agriculture and forestry programmes be more closely linked to provide more integrated programme delivery.

5.5.B That technical exchanges be planned on a regular basis between NGO and Kabul based UN projects, as well as projects throughout the south Asia region.

5.5.C That information on appropriate applied technology from natural resource based projects throughout the region be made available to project staff through workshops, seminars, newsletters, films, videos and other forms of communication. ACBAR/UNOCA in Peshawar and UNOCA/UNDP in Kabul should play a leading role in providing these forums for information exchange.

5.5.D That NGOs and UN agencies form more partnerships and linkages between complementary projects in order to offer a region a more integrated programme.

The possibilities for such partnerships are endless, however obvious examples include:

- UNICEF linking with FAO forestry to provide courtyard orchards as a component of nutrition programmes;
- agricultural projects linking with forestry ones to provide watershed management (erosion control, windbreaks, dune and soil stabilization for slopes and hillsides);
- education linking with forestry and agriculture to provide orchards and shade for schools or outdoor classrooms, and experiential learning for school children in sound forest management and agricultural practices.

5.5.E That an environmental planning consultant be made available through UNOCA/UNDP and ACBAR to NGOs and UN agencies, to assist in project planning and conceptualization, suggest linkages between natural resource based projects, and provide advice -- particularly at the pre-Mission stage -- on the types of natural resource opportunities a Mission might observe.

This recommendation is also relevant to the environmental planning recommendations which follow.

## 5.6 ENVIRONMENTAL PLANNING AND SCREENING CAPACITY

With the exception of UNDP, no agencies or organizations have specific environmental screening guidelines or a formal procedure for assessing projects for sound environmental planning and practice. In part, this task is performed by agricultural or forestry experts within NGOs and agencies, and carried out as part of the Interagency Review that occurs with project proposals. However a distinct environmental screening process does not take place.

Nor do agencies or NGOs have any specific in-house environmental planning expertise for use during the conceptual stages of a project and/or to advise Reconnaissance Missions. This means that promises which may not have been environmentally sound have been made to local people by Missions. An example is the recent support offered by UNOCA to a wood fired brick factory (albeit small) when there is the more progressive and environmentally sound technology of compressed bricks available, as demonstrated by GTZ in Peshawar. It takes 357 megajoules of energy to produce one cubic meter of compressed brick, compared with 3,500 megajoules for one cubic meter of burned brick. In retrospect, had environmental advice been available at the time, this alternative to burned bricks might have been proposed.

As a result of criticism at the 1972 UN Conference on the Human Environment in Stockholm -- criticism of the serious environmental implications of projects funded by international and national development institutions, many international agencies have expressed a commitment to protect the environment and carry out environmental impact assessments (EIA) for major projects. UNDP decided to go beyond the assessment approach, which focuses on problems associated with specific projects, and adopt an environmental management approach which allows not only for assessment of constraints but also for the formulation of sustainable development alternatives and opportunities.

UNDP's approach has several facets: the preparation of environmental overviews; the screening of UNDP activities and policies; the preparation of an Environmental Management Strategy for selected activities; the identification of key "actors"; the establishment of environmental check-points in a Project Cycle as well as in Country Programs and Technical Cooperation; and the formulation of alternatives in project design. The short term emergency orientation of projects in Afghanistan makes some of these steps impossible to take, however an adapted version of the UNDP environmental process is possible.

Appendix F contains examples of the type of environmental screening questions that are used in the UNDP project planning cycle. While these questions are not suited specifically to Afghanistan's circumstances, they show the approach of environmental screening that could be easily modified for use by agencies and NGOs.

It is essential that environmental planning assistance be given at an early stage (before project definition) in order to maximimze the identification of natural resource based opportunities and to minimize the piecemeal approach which tends to concentrate on problems rather than opportunities. Screening and critical review at the project approval stage are also necessary, however by then it is often too late in the game for alternatives to be identified, and the process becomes instead a mitigative one of patching up projects.

## *RECOMMENDATIONS*

*Short Term*

**5.6.A** That an environmental planning consultant be made available through UNOCA/UNDP and ACBAR to NGOs and UN agencies to assist in project planning and conceptualization, to suggest linkages between natural resource based projects, and to be available during the pre-Mission stage to advise Missions on the types of natural resource opportunities to watch for while on Missions.

**5.6.B** That a set of environmental guidelines be designed by the environmental planning consultant in consultation with NGOs and UN agencies, and that these guidelines be used in project design stage as well as the project approval stage.

**5.6.C** That a set of guidelines be adapted for field staff to assist in checking environmental aspects of projects at critical points.

**5.6.D** That the environmental planning consultant facilitate workshops and seminars for project staff in relevant areas of environmental management, such as environmental screening techniques, rapid rural appraisal environmental techniques, and areas of special environmental interest as requested by project staff.

**5.6.E** That the environmental planning consultant act as the focal point for Afghanistan UNCED activities -- preparation of the National Report, organization of technical workshops, and the facilitation of an Environmental Action Plan for Afghanistan.

## 5.7 RESEARCH AND MONITORING

Monitoring is essential in achieving maximum effectiveness of programmes and projects, both short term and long term. However, the short term nature of some of the emergency aid projects mitigates against a continuous monitoring system. The Mission observed that the concept of basic monitoring linked to project design and implementation was not well understood by many project staff or project directors (UN and NGOs).

Both UNOCA and ACBAR indicated that monitoring was not part of their mandate. UNDP indicated that it expects project staff to carry out their own monitoring. We spoke with project staff who were sent off on "monitoring" missions with no set guidelines or criteria. Some project staff were mystified as to what monitoring was all about, and needed assistance in clarifying what monitoring is, why it should be done in a time of emergency aid, and (more importantly) how to do it. We did not find any UN agency which was offering assistance in designing monitoring systems for projects. Each project seemed to be on its own as far as monitoring was concerned.

Whether monitoring is built into projects on a project-by-project basis, or whether an overall system of monitoring is carried out by region or sector, we believe that some uniform standards and criteria for monitoring should be available to project staff.

While the Mission understands that UNOCA and ACBAR have chosen not to undertake a monitoring role, we question whether there should not be some overall monitoring service designed in cooperation with NGOs and UN agencies to provide standardized monitoring services and feedback. In addition such a service can assist projects in developing sound field-tested self monitoring techniques.

It is essential that monitoring not only acts as a flexible feedback system for project planning in the short term, but also helps to direct regional and sectoral planning efforts when peace returns and regional land and resource planning becomes possible.

While the data collection through the SCA Agricultural Survey is impressive, it is not tied very well to the project planning and assessment cycle. The SCA realizes this and efforts are being made to have the Survey play a more key role in project planning.

Research has taken a low priority due to difficult and uncertain working conditions and the lack of funds for anything but emergency aid. However, forms of participatory research can be built into projects to act as an information source, provide a type of monitoring feedback, and help make project implementation more effective.

### *RECOMMENDATIONS*

***Short Term***

**5.7.A** That a systematic form of monitoring be developed for use by project staff in all projects of the same type, so that cumulative knowledge can lead to better overall planning.

**5.7.B** That the documentation of research priorities be undertaken to ensure the ideas are not lost.

**5.7.C** That participatory research methods be used more widely in projects.

## 5.8 ENVIRONMENTAL LEGISLATION AND INSTITUTIONAL FOCUS

The lack of an institutional focus within the Government of Afghanistan on environmental matters is a major obstacle to sound development planning. Such a focus can help ensure that development agreements are environmentally sound. It could be found in a Ministry of the Environment, an environmental cell within the Deputy Prime Minister's Office, the Planning Commission or the Ministry of Agriculture and Land Reform. It is not possible financially for the Government of Afghanistan to establish a Ministry of Environment, therefore the appropriate options would be a cell within an existing ministry or the Prime Minister's Office.

UNDP Kabul has recognized the need for an environmental focus within the Government and has requested that an environmental cell be established within the Deputy Prime Minister's Office.

In addition, there is no effective legislative base for the sound management of resources in Afghanistan. While draft legislation exists for forestry, wildlife and environmental management, it is meaningless in the present circumstance of war. There is a complete lack of infrastructure to administer, interpret and enforce such legislation. Consequently, the Mission did not spend time examining the proposed acts, but when peace returns to Afghanistan, bringing a country-wide system of administration and enforcement, these pieces of legislation should be examined in light of principles of environmental management and sustainable use of resources.

*RECOMMENDATIONS*

*Short Term/ Long Term*

**5.8.A** That the Government of Afghanistan be encouraged to establish at the earliest opportunity an environmental focus within a government institution, preferably the focus in the Deputy Prime Minister's Office recommended by UNDP, or alternatively a cell within the Planning Commission or the Ministry of Agriculture and Land Reform.

**5.8.B** Environmental expertise for the new environment cell could be provided through Technical Assistance Agreements when the political situation allows direct aid to the Government of Afghanistan.

## 5.9 UNITED NATIONS CONFERENCE ON ENVIRONMENT AND DEVELOPMENT (UNCED)

The UN will be holding an international conference in Brazil during June 1992 to examine environment and development issues, problems and solutions. Countries throughout the world are invited to participate in UNCED, which is planned as a 20 year followup to the Stockholm Conference on Human Environments.



*Child collecting water from standpipe* Photo: Nancy MacPherson

There will be a UN sponsored conference with member delegates from governments around the world, as well as a parallel conference for non government organizations including environment and development NGOs, private sector and labour organizations. Requirements for participation in UNCED include the preparation of a National Report detailing environment and development priorities and action plans, along with some form of consultation to gain consensus on the report.

With the exception of UNDP Kabul, few of the NGOs, UN agency staff and Government staff knew about UNCED in any detail or the opportunity for Afghanistan to participate. Mission members provided basic information and committed themselves to providing more information to ACBAR and UNOCA for distribution.

While the Mission appreciates the sensitive politics associated with Afghanistan's

# PART TWO

# OPERATIONAL PLAN

participation in such forums, UNCED will provide an opportunity for NGOs and government representatives to participate in separate programmes. At the very minimum, UNCED presents an opportunity and venue for a National Report detailing the environment and development issues facing Afghanistan today, thus refocusing the attention of donors and governments throughout the world on Afghanistan.

The Mission has forwarded information on UNCED to ACBAR in Peshawar, as well as to Kabul based projects.

*RECOMMENDATION*

**5.9.A** That UNDP facilitate the preparation of a National Report for Afghanistan, and that NGOs separately explore opportunities for participating in UNCED activities in the region.

It should be noted that for security reasons the Study Team's trips to many field sites for further assessment of natural resource potential were significantly restricted. While we tried to visit a sample of projects and areas, we are fully aware that our current first hand experience of Afghanistan is limited. Although not a substitute for our own first hand experience, observations from experienced project staff who travel and work in various provinces throughout the country have been used where appropriate. We are grateful to them for freely passing on to us their knowledge and observations.

Appendix B presents a detailed list of who met with the Study Team and what field trips were taken. In summary, they were as follows.

**GENEVA**

| | |
|---|---|
| *UNOCA* | Mr. Francesca Strippoli, Ms. Magda Ninabar |
| *IUCN* | Mr. Vitus Fernando |

**ISLAMABAD, PAKISTAN**

| | |
|---|---|
| *UNOCA* | Mr. Martin Barber, Mr. Naveed Hussain, Ms. Sarah Ahmad, Mr. Tahir Babar and Mr. Ian Haugland |
| *Food and Agriculture Organization of the United Nations (FAO)* | Mr. Anthony Fitzherbert |
| *World Food Program* | Mr. Gerard Viguie |
| *Save the Children (USA)* | Mr. Sultan Aziz |
| *UNESCO* | Mr. Bruce Cahill |
| *UNDP* | Mr. Bob Eaton |

**PESHAWAR, PAKISTAN[1]**

| | |
|---|---|
| *UNOCA* | Mr. Wolfgang Erffa, Dr. M. Alam |
| *International Rescue Committee (IRC)* | Mr. M. Hamayon and Mr. R. Bovrier |
| *MADERA* | Mr. Olivier Cossee |
| *Agency Co-ordinating Body for Afghan Relief (ACBAR)* | Mr. Jon Bennett |
| *SERVE* | Mr. Herman Nyhoff |
| *Save the Children, USA* | Mr. Mark Williams |
| *Danish Committee for Aid to Afghan Refugees* | Mr. Asger Christensen and Mr. Abdul Fatah |
| *Development Alternatives International (DAI)* | Mr. Noori |
| *German Agency for Technical Cooperation (GTZ)* | Mr. Wilfried Herrich and Dr. Mohammed Hessam |
| *Swedish Committee for Afghanistan* | Dr. Azam Gul, Dr. Johan Scharr, Mr. Don Meier, Mr. Mark Whitton, Mr. Tom Morrison |

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[1] It should be noted that the Mission was unable to meet with a number of American NGO staff due to their absence from Peshawar during the Gulf War.

# INTRODUCTION

Part Two presents an outline for implementation of the recommendations on environmental management in Afghanistan made by the Mission. We have endeavoured to set out environmental priorities for UNOCA for 1991/92, along with an overview of the project components necessary to carry out these priorities. These components include a profile of:

- scope of work (project concept);
- inputs required (staff, equipment, materials);
- cost estimates (funds from existing budgets or new funds);
- location (where the project could be implemented).

This section has been designed to assist UN agencies and NGOs in their project preparation work of formulating project concepts and objectives, preparing budgets and outlining project activities. While we are unable to specifically tailor our recommendations to the work of each organization, the outlines can be adapted to the characteristics of specific regions and programme delivery realities throughout Afghanistan.

# SUMMARY OF RECOMMENDATIONS

## FOREST RESOURCES

*Short Term*

- greater emphasis on social forestry and agroforestry;
- tree planting in schools, courtyards, lanes and on hillsides;
- involvement of farmers, shuras, commmunities, school children, teachers;
- establishment of farmers' woodlots and protective woodlots;
- incentives for tree planting;
- support for sustainable forest products;
- land use mapping;
- a much strengthened education and extension programme;
- selected and limited watershed protection;
- support for energy alternatives such as solar energy, micro-hydro and biomass, fuel efficient cookers and communal baking systems;
- technical exchanges.

*Long Term*

- protection of natural forests;
- selection of representative areas;
- clearing of mines from key areas of natural forest;
- assessment of existing rangelands.

## AGRICULTURE

### Management of Agrochemicals

- promotion of alternatives to pesticides;
- integrated pest management schemes;
- immediate assessment of BHC stores;
- enhanced extension services;
- provision of adequate safety equipment;
- environmental health testing.

### Waterlogging and Salinity

- increased use of saline tolerant vegetation;
- careful assessment of drainage options, cognizant of the value of wetlands.

### Apiculture

- increased use of apiculture for orchard and agroforestry projects to provide increased pollination and additional revenue.

### Aquaculture

- expansion of existing rainbow trout project to other suitable areas in Afghanistan;
- development of a marketing strategy.

## ENERGY ALTERNATIVES

- increased funding and promotion for projects aimed at wood substitutes such as solar energy, fuel efficient stoves, compressed bricks;
- workshops on energy efficient technology;
- technical exchanges;
- expansion of extension and education services.

## WILDLIFE AND PROTECTED AREAS

- immediate strategies for villagers to save artefacts;
- assessment of damage to protected area candidate sites;
- strategies for sustainable utilization of wildife;
- encouragement to join Ramsar and CITES.

## TRAINING AND EXTENSION SERVICES

- an immediate expansion and strengthening of successful extension programmes such as MADERA and the Crop Protection Training Program of UNDP/FAO, SCA, DACAAR and Afghanaid;
- closer links between agriculture and forestry projects;
- new extension partners for FAO Kabul forestry;
- modest multi-purpose extension training centres.

## BASELINE DATA AND MAPS

- design of a modest system of baseline collection;
- extension of the SCA Agricultural Survey to include forestry and agroforestry related data;
- increased production of land use maps.

## ENVIRONMENTAL AWARENESS AND EDUCATION

- increased development of environmental education materials for extension work;

- workshops for teachers;
- workshops for project staff (UN and NGOs);
- public awareness programmes.

## SHORT TERM PLANNING

- longer planning horizon where possible;
- increased integration of projects.

## INTEGRATED PROJECT PLANNING, LINKAGES AND EXCHANGES

- greater integration of agriculture and forestry projects;
- technical exchanges;
- information exchanges on environmentally appropriate technology;
- more partnerships and linkages between NGOs and UN agencies;
- availability of an environmental planner to NGOs and UN agencies.

## ENVIRONMENTAL PLANNING AND SCREENING CAPACITY

- availability of an environmental planner to NGOs and UN agencies;
- development/adaptation of environmental assessment and guidelines material;
- seminars and workshops for project staff;
- coordination and facilitation of UNCED activities for Afghanistan.

## RESEARCH AND MONITORING

- development of a standardized approach to monitoring;
- workshops in practical monitoring skills;
- documentation of research priorities for future use;
- promotion of participatory research methods.

## ENVIRONMENTAL LEGISLATION AND INSTITUTIONAL FOCUS

- establishment of an environmental focus within the Government of Afghanistan;
- linkages with environmental expertise.

## UNITED NATIONS CONFERENCE ON ENVIRONMENT AND DEVELOPMENT

- facilitate preparation of National Report (UNDP).

## RECOMMENDED PRIORITIES FOR UNOCA 1991/92

Having made the foregoing recommendations on environmental management in Afghanistan, we now turn to UNOCA's request for a proposed set of priorities for 1991-92 based on a figure of $1.5 million. We have endeavoured to set out a list of priorities that takes into account the expenditure of new funds as well as a more effective use of existing budgets. It is important to note that a significant number of the Mission's recommendations do not require substantial amounts of new funds. With minimal expense, improvements can be made to existing projects, and a modest amount of new funds can make major new initiatives in environmental management possible.

The budget figures add up to the expense total of US$ 1.5 million suggested by UNOCA. NGOs and other agencies which might wonder how we arrived at the figures should be aware of this.

The Mission's priorities are based on the following:

- urgency of environmental need;
- most efficient use of funds;
- the need to provide increased integration and coordination between natural resource based projects.

In terms of urgency of need, we felt that programmes addressing the critical environmental problems of deforestation, erosion, fuelwood/timber supply and watershed management warranted top priority on the part of UN agencies and NGOs (in addition of course to urgent humanitarian projects such as food aid, shelter and health services).

With respect to the most efficient use of funds, we felt that the programmes of UN agencies and NGOs would all benefit from the services of an environmental planner, who could work on an itinerant basis between NGOs and UN agencies in Islamabad, Peshawar and Kabul, providing environmental assessment and screening advice, environmental management tools, and training on a wide range of projects in the design, implementation and monitoring phases.

The Mission felt that along with the provision of an environmental planner, the development of multi-purpose extensionists and the provision of modest extension/training centres would go a long way towards transferring technical knowledge and skills, and providing more coordination in the delivery of programmes in Afghanistan.

In that light, we would recommend the following priorities be undertaken by UNOCA for 1991/92.

| PRIORITY PROGRAM AREA | FUNDING SOURCE | TOTAL |
|---|---|---|
| **Environmental Planning Capacity (cf. Part I, Sec.5.6)** | **New** | |
| Environmental planning consultant (5.6) | | $75,000 |
| Field related workshops, seminars, information exchange -- UN, NGOs, Government | | 75,000 |
| Integrated Project Planning (5.5) | | 50,000 |
| **Social Forestry (I, 4.1)** | **FAO current/proposed/new** | |
| Forestry and Land Use Maps | FAO current + | 50,000 |
| Education and Training | FAO current + | 100,000 |
| Watershed Management | New | 275,000 |
| Alternatives to Timber | Existing + | 50,000 |
| **Agriculture (I, 4.2)** | **FAO current/proposed/new** | |
| Chemical Management Remedial Measures | Existing FAO | - |
| Extra Training, Health Monitoring, Extension | New | 20,000 |
| Apiculture | FAO current/proposed | - |
| Aquaculture | FAO current | - |
| **Energy Alternatives (I, 4.3)** | **Existing/new** | |
| Expansion of Existing Programmes | New | 150,000 |
| Workshops, Technical Exchanges | New | 50,000 |
| Extension Materials | New | 20,000 |
| **Training and Extension (I, 5.1)** | **Existing/proposed/new** | |
| Expansion of Existing Extension Services | New | 150,000 |
| Development of Extension Centres and Materials | New | 200,000 |
| **Environmental Education (I, 5.3)** | **New** | |
| Workshops for Teachers, Materials and Handbooks (plus Extension) | New | 75,000 |
| **Baseline Data and Maps (I, 5.2)** | **Current/new** | |
| Field oriented natural resource data collection, maps, training and monitoring materials | New | 110,000 |
| **Protected Areas (I, 4.4)** | **New** | |
| Assistance to villagers -- protection of artefacts | Existing missions/new | 50,000 |
| **Government Environmental Focus (I, 5.8)** | **UNDP** | |
| **UNCED Activities (I, 5.9)** | **UNDP** | |
| **TOTAL** | | **$1,500,000** |

# PRIORITY PROJECT CONCEPTS

## 4.1 ENVIRONMENTAL PLANNING CAPACITY

**Status**

New project, new funds

**Scope of Work**

The Mission feels that UN agencies as well as NGOs could use the services of a environmental planner to undertake the following tasks:

- assist in project planning and design;
- develop/adapt environmental assessment materials for use by all project staff;
- suggest linkages between natural resource based projects;
- advise at the pre-Mission stage on natural resource opportunities;
- assist in training field staff in techniques of environmental assessment and monitoring;
- develop a set of environmental guidelines in consultation with NGOs and UN agencies, for use in project design stage and approval;
- develop or adapt guidelines and checklists for field staff; [2]
- facilitate workshops and seminars for NGO and UN project staff in relevant areas of environmental management such as environmental screening techniques, rapid rural appraisal environmental techniques, and areas of special environmental interest as requested by project staff (energy efficient technology, mapping, etc.);
- act as a focal point for UNCED and facilitate the involvement of all interested parties.

The Mission feels that in order to fully appreciate the realities of Afghanistan, this person should have experience working cross-line and cross-border in the region. The planner should also have considerable experience in project design and implementation in isolated rural development situations, preferably in an Islamic country.

We feel that the option of a full time person is preferable to short term consultancies since continuity of contact with groups and organizations is extremely important and consultants who come in for brief periods cannot build up the same kind of working relationships. In addition, we anticipate that a full time environmental planner would be kept very busy.

It is unrealistic to expect that an environmental planner involved in natural resource based projects will have a technical background in every area. For that reason we suggest that a small pool of money be set aside for hiring specialized consultants where needed. As in the case of a chemical expert to assess the BHC situation, we would expect this money to come from the UNDP/FAO budget for the year; this may not, however, be possible in all situations where a technical environmental specialist is needed for a short time. [Continued next page]

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[2] Checklists for environmental screening of NGO development projects, published by the Canadian Council for International Co-operation (CCIC) are a useful place to begin. They are an attachment to this report.

### Location

We suggest that the environmental planner have an office in UNDP or UNOCA, and divide his or her time on a demand basis between projects in Kabul, Peshawar, Quetta and Islamabad (and elsewhere as the security situation allows). Much of the environmental planning/assessment part of the work is done at the beginning stages of project design and approval -- which usually occur in main project offices in Peshawar, Kabul and Islamabad. The environmental management aspects of the work of the Planner may take place at the monitoring stage in the field or at least in field offices such as the one at Mazar-i-Sharif.

### Inputs Required

- Environmental planner with appropriate skills and experience;
- support services from office base in UNDP or UNOCA;
- training materials and equipment;
- cooperation of ACBAR in the provision of space for meetings, workshops and occasional office support.

### Cost Estimates

- salary for environmental planner (range: US$50-60,000);
- relocation costs and benefits;
- workshops, seminars, development of environmental assessment and management material and printing ($75,000);
- integrated project planning ($50,000).

## 4.2 SOCIAL FORESTRY

### Status

FAO current revised project plus some new funds

### Scope of Work

As outlined in the Mission report, the current revised UNDP/FAO Kabul Forestry project involves implementing a range of social forestry components. The Mission was in agreement that while the elements of the FAO Kabul proposal are appropriate for social forestry, a major emphasis must be placed on improved extension services that will transfer technical knowledge to areas and people in need.

In addition to the social forestry work components proposed in the FAO revised document, the Mission felt that an increased emphasis should be placed on:

- the production of forestry and land use maps;
- education and extension;
- initial watershed management;
- increased alternatives to timber.

### Inputs Required

- existing FAO forestry staff, extension staff, UNDP Energy Alternatives staff and Habitat staff;
- an extension partner skilled in rural and community development to work with FAO Kabul on social forestry development;
- expansion of energy alternatives programmes;
- increased support to MADERA, and MADERA type models of social forestry.

### Cost Estimates

| | |
|---|---|
| Forestry & Land Use Maps: | FAO current spending plus $50,000; |
| Education & Education: | FAO current spending plus $100,000; |
| Watershed Management: | New appropriation of $275,000; |
| Alternatives to Timber: | Existing budgets plus $50,000. |

### Location

Peshawar and Kabul

## 4.3 AGRICULTURE

### Status

Current UNDP/FAO projects plus some new funds

### Scope of Work

- chemical management remedial measures
- support for apiculture
- support for aquaculture.

The Mission recommends that remedial measures be taken as part of the current UNDP/FAO/SCA Crop Protection programme to ensure the safe and efficient use of agrochemicals, primarily pesticides. This can be done by the existing staff plus a short term chemical expert who can assess the current BHC supplies and draw up a management plan for the storage, transport and use of this chemical.

The Mission recommends that a beekeeping component be added where possible to orchard and agroforestry projects. This could be done cross-line and cross-border through existing agriculture projects, with the assistance of an apiculturalist from FAO. FAO is currently proposing to extend its Kabul based apiculture project to Mazar-i-Sharif, and the FAO office in Islamabad is experienced in the planning and delivery of apiculture projects.

The Mission recommends continued support for the Qargha Lake trout farm and an extension of this project through the supply of stock to other suitable freshwater lakes in Afghanistan. This can be done within the existing FAO work plan and budget.

### Inputs Required

- short term chemical expert to assess BHC stores;
- medical partner or trained extensionists for health monitoring;
- small amount of support for apiculture and aquaculture if existing budgets cannot provide for these.

### Location

- chemical expert in Mazar-i-Sharif and other BHC locations;
- health monitoring in crop protection project areas;
- apiculture expert in Kabul, Mazar-i-Sharif and other appropriate locations as security permits;
- fish culture experts to provide stock to Bande Amir, Qargha Lake and Baghlan Chasma Shier Farm.

### Cost Estimates

| | |
|---|---|
| Chemical Management Remedial Measures: | Existing FAO |
| Additional Training, Extension Materials: | New $20,000 |
| Health Monitoring: | Existing |
| Apiculture Project: | Existing FAO |
| Fish Culture Extension: | Existing FAO |

KABUL

| | |
|---|---|
| *UNOCA* | Mr. Antonio Donini, Eng. Siddiqi |
| *United Nations Development Program (UNDP)* | Mr. Ross Mountain, Mr. François D'artagnan, Mr. Claude Villard |
| *Food and Agriculture Organization of the UN (FAO)* | Mr. Harry Dewan, Dr. M. Pant |
| *UNESCO* | Mr. Salmon Abu Ali |
| *World Food Program* | Mr. J.B. Barathoki |
| *UNICEF* | Mr. J. Mahase, and Mr. Samay Saquib |
| *Gov't of Afghanistan* | Mr. Ghofran, Minister of Agriculture; Mr. Hazrat Hussain Khaurin, President, Forestry and Range Department; Mr. Ghulam Hassan, Officer in Charge, Qargha Nursery; Mr. M.I. Sulfizada, Rangeland Specialist; Eng. Azizi, Minister of Rehabilitation and Rural Development; Col. Shakoor, Director of Demining Cell; Dr. F. Neikzad, Minister of Construction; Dr. M.M. Ejasy, Minister of Health; Mr. Qayoum Noorzai, Deputy Prime Minister. |

FIELD VISITS

*Kabul*

- Mapping Department, Ministry of Agriculture, Kabul;
- Qargha Lake Forestry Nursery, Kabul;
- Qargha Lake Trout Hatchery, Kabul;
- Renewable Energy Site, UNDP, Kabul:
  Solar Production Unit, Ministry of Water and Power,Kabul
  Solar Demonstration Site, Kabul
  Solar Installation, Kabul Orphanage and School;

*Mazar-i-Sharif*

- UNDP/FAO Crop Protection Program;
- Warehouse Storage for BI58 and BHC;
- Plant Protection Department;

*Peshawar*

- GTZ Masonry Training Centre;
- Domestic Energy Saving Project;
- GTZ Demonstration Site;
- SERVE Solar Oven Demonstration Site.

In discussions with Mission members, participants were asked to address three areas:

1) technical, planning, monitoring and evaluation details of the natural resource based projects offered by their organization or agency;

2) how, in their view, these projects could be improved in terms of environmental management, and;

3) whether they could identify any major environmental/natural resource problems not being addressed currently.

## 4.4 ENERGY ALTERNATIVES

### Status

Existing UNDP and NGO projects with some new funds

### Scope of Work

The Mission supports energy alternative projects which promote timber substitutes and more efficient use of renewable energy resources. We propose that existing energy alternative projects be expanded provided they are deemed to be technically sound and successfully applied in the field. In particular we were impressed by the work of the UNDP Energy Alternatives project based in Kabul as well as that of GTZ in Peshawar, and there may be other worthy alternative energy projects that the Mission did not have an opportunity to visit which should also be considered for expansion. Technical project staff should advise on a strategy for expansion of these projects -- perhaps through provision of funds for additional production capacity as in the case of the Kabul UNDP Energy Project.

In keeping with an increased emphasis on energy alternatives and wood substitutes, technical exchanges and workshops should be held with project staff to develop awareness of and promote the most effective technology. The Mission found that little exchange of staff and information actually took place between UNDP energy projects in Kabul and Peshawar based energy projects.

### Inputs Required

Technical energy specialists will have to advise on the inputs required for the expansion of current projects.

### Location

Kabul, Mazar-i-Sharif and Peshawar.

### Cost Estimates

| | |
|---|---|
| Expansion of Existing Programmes: | New funds $150,000 |
| Workshops and Technical Exchanges: | New funds $50,000 |
| Extension Materials: | New funds $20,000 |

## 4.5 TRAINING AND EXTENSION

### Status

Existing extension programmes, plus proposed UNDP rural development centres, new funds

### Scope of Work

The Mission felt that one of the most important areas in need of increased support was that of extension and training -- *i.e.*, the transfer of technical knowledge and skills to areas and people in need. This was particularly noted with respect to the FAO forestry programme based in Kabul. It is proposed that new extension partners be found for FAO Kabul with specific expertise in rural and community development and training. These partners could either be NGOs or a new FAO/UNDP extension programme initiative.

The establishment of multi-purpose extension centres is also recommended by the Mission. This would entail coordination of various different extension programmes of UN agencies and NGOs and the sharing of common facilities and extension support services.

### Inputs Required

- new extension partners for FAO/UNDP Kabul;
- development of extension materials by contract workers or staff;
- establishment of multi-purpose extension centres/rural development centres.

### Location

- centres in priority areas in Afghanistan;
- extension materials developed in Peshawar or Islamabad.

### Cost Estimates

| | |
|---|---|
| Expansion of existing extension services: | New funds $150,000 |
| Development of multi-purpose extension centres: | New funds $200,000 |

## 4.6 ENVIRONMENTAL EDUCATION

### Status

New programme, new funds

### Scope of Work

- the development of environmental education materials to be used in existing and new extension programmes -- developed or adapted on contract or through UNESCO;
- workshops for teachers, extensionists and project field staff;
- public awareness programme.

### Inputs Required`

- contract funds to adapt environmental awareness materials;
- funds to produce and copy materials;
- time of environmental planner.

### Location

Kabul, Mazar-i-Sharif, Peshawar and Quetta for workshops. Other locations as security permits.

### Cost Estimates

| | |
|---|---|
| Workshops for Teachers: | New funds $40,000, |
| Materials, Handbooks: | New funds $35,000 |

N.B. There is overlap between funds marked for extension materials and these funds for environmental education.

## 4.7 BASELINE DATA AND MAPS

**Status**

Current projects, new funds

**Scope of Work**

- design of simple field data collection system;
- expansion of SCA Agricultural Survey (new component or expansion of existing service) to include forestry;
- mapping training;
- development of monitoring materials and training for monitoring.

**Inputs Required**

- contract to SCA Agricultural Survey;
- environmental planner to work with project staff on monitoring requirements and data collection categories;
- environmental planner to facilitate the development of training materials on data collection and maps.

**Location**

Peshawar, Kabul, extension centres

**Cost Estimates**

New funds: $110,000

## 4.8 PROTECTED AREAS

### Status

New programme, new funds

### Scope of Work

This will involve the development of a strategy to assist villagers in retaining valuable artefacts without destroying archaeological and historically significant sites. Field workers from all different projects would be given a briefing on the strategy should they encounter the situation in their field work.

UNESCO and other cultural/protected area organizations can be called upon to assist in the development of the strategy. Staff of the World Heritage Commission (UNESCO) can advise on the strategy as can IUCN's Commission on Protected Areas. These organizations may be able to provide a consultant for this work.

### Inputs Required

- expert advice from the above organizations;
- small fund for village incentives or preservation of artefacts/sites;
- time of environmental planner in facilitating the above.

### Location

Where extension courses are offered

### Cost Estimate

New funds: $50,000

## 4.9 GOVERNMENT ENVIRONMENTAL FOCUS

**Status**

UNDP current programme

**Scope of Work**

The establishment of a unit or position in the Government of Afghanistan at Kabul with responsibility for environmental matters.

**Inputs Required**

UNDP to meet with the Government of Afghanistan

**Location**

Kabul

**Cost Estimate**

Not available

## 4.10 UNITED NATIONS CONFERENCE ON ENVIRONMENT AND DEVELOPMENT (UNCED)

### Status

UNDP Headquarter funds

### Scope of Work

The participation of the Afghanistan government and/or NGOs in the work of the United Nations Conference on Environment and Development, Brazil, June, 1992.

### Inputs Required

- time of environmental planner or other person to facilitate the UNCED related activities such as a National Report, consultations, etc.;
- time commitment on the part of participants.

### Location

Peshawar and Kabul

### Cost Estimate

Consultant to prepare National Report and coordinate UNCED consultations in Afghanistan and with NGOs: UNDP UNCED funds

# APPENDICES

# Appendix A

## TERMS OF REFERENCE OF THE MISSION

Operation Salam / IUCN

# ENVIRONMENTAL MANAGEMENT IN AFGHANISTAN'S RECONSTRUCTION

## Introduction

With the gradual return of peaceful conditions to parts of Afghanistan, the international community has begun to mobilize considerable support for the urgent process of repairing the damage done by a decade of warfare and helping to place Afghanistan's development on a sound footing. IUCN - the World Conservation Union - and Operation Salam would like to ensure that due attention is paid to environmental factors in programmes for Afghanistan's reconstruction both in the negative sense (avoiding unnecessary damage) and in the positive sense (identifying environmental management actions which will have positive development consequences).

## Proposal

IUCN and Operation Salam propose the fielding of a two-person mission for a five-week duration. One member of the team (five weeks) would focus on assessing the current state of Afghanistan's natural resources and on identifying priority actions to be included in programmes of assistance to Afghanistan in this respect. The second member (three weeks) would focus on environmental procedures to be incorporated into the international community's programme and project planning to ensure that these contribute to the extent possible to development results which are sustainable.

The team would first visit Operation Salam and IUCN Headquarters in Switzerland for extensive discussion of mission objectives, review of documentary material and preliminary identification of priority areas. They would then visit Pakistan and Afghanistan, interacting closely with Operation Salam and following their guidance for elaboration of a detailed programme of consultations in Islamabad, Peshawar and Quetta. Finally, the team would visit selected sites in Afghanistan, under the guidance of Operation Salam.

Their report would propose not only a series of priority projects in Afghanistan for incorporation into the programmes of international agencies working in the country, but also measures which might be taken by these agencies to ensure that current programme and project preparation is undertaken with due regard to the requirements of sustainable resource utilization.

## Profile of the Consultants

One of the two consultants would be a natural resource manager, with extensive experience in the field of forestry, range management, wildlife and protected areas and, if possible, direct experience with Afghanistan or similar environments. The other would be an environmental planner, with a background in environmental impact assessment and extensive experience with incorporation of environmental considerations with development planning. Experience with the United Nations system would be sought.

## 2.3 DATA AND INFORMATION BASE

Current data related to the natural resource base of Afghanistan are practically non-existent for several reasons. The inability of project staff to travel safely through areas of conflict in order to document the status of resources as well as the current fragmentation of administrative areas of the country between *mujehedin* (resistance) and government forces work against the establishment and maintenance of a country wide information system.

Even natural resource information dating back to the 1970s is difficult to locate physically due to the many political changes within government offices over the past 12 years. The Mission visited several government departments within the Ministry of Agriculture where there was no evidence of previous reports and data. For example, the baseline data available in 1981 to an FAO team preparing a document entitled *National Parks and Wildlife Management in Afghanistan: A Contribution To a Conservation Strategy* could not be found in either government offices or UN offices in Kabul. A private copy of this document was obtained from the author in Geneva.

Maps dated 1973 were available to us, along with several Ministry of Agriculture hand-coloured maps using pre-war information on vegetation areas, traditional nomadic routes and pistachio forests.

For the purposes of our Mission, we relied on data supplied by various UN agencies, NGOs, Mission Reports and information from the Ministries in the Government of Afghanistan including the *Statistical Year Book, 1989-1990,* Ministry of Statistics, Kabul. Documents relating to natural resources in Afghanistan were obtained from Geneva, Islamabad and from independent sources. However, we often found that summary data varied significantly from report to report. A list of the documents used for this report is found in the "References" section which follows the appendices.

The lack of information has presented obvious difficulties in assessing the status of natural resources in Afghanistan. However, given the limitations imposed by 12 years of war and the need to start planning for long term rehabilitation of the country, it is useful if not necessary to try to make assessments of the status of forests, agricultural land and water in Afghanistan today, based on whatever combination of descriptive and statistical information can be found. Our conclusions and recommendations are therefore based on a combination of our consultations with people working in field projects and agencies, a review of limited baseline data and our first hand experience of projects in Afghanistan and Peshawar.

# TERMS OF REFERENCE

## A. Consultant on Natural Resource Management

1. Visit Operation Salam Headquarters and IUCN for an orientation and briefing on the mission, its organization and objectives.

2. Gather and review documentary material related to environment and natural resource management priorities in Afghanistan, and particularly programmes, action plans and projects in this field underway or planned prior to the initiation of hostilities in 1979.

3. Consult as required (by phone) with Afghan natural resource experts currently living abroad and with expatriate experts on the natural resources in Afghanistan with a view to gathering information on the current State of the Environment in Afghanistan and priorities for environmental action in Afghanistan's reconstruction.

4. Visit selected UN agencies, NGOs and other appropriate bodies in Islamabad, Peshawar and Quetta to gather information both on Afghanistan's current natural resource situation and on plans and projects aimed at addressing them.

5. In close consultation with Operation Salam, visit Kabul and other selected areas of Afghanistan, there to:

   a) Consult with UN, NGO and other appropriate representatives as in 4 above.

   b) Consult Afghan Government representatives concerning their assessment of the current environmental situation (in particular as it relates to living natural resources) and their plans and programmes to address the situation.

   c) Observe first-hand the status of rangelands, forests, wetlands, protected areas, wildlife, etc. in selected areas of the country visited.

   d) Consult any available documentary sources on priorities in natural resource management.

   e) Identify urgent action required to meet natural resource management priorities.

6. Submit for discussion at a debriefing session a draft:

   a) State of the Environment report for Afghanistan.

   b) Plan of Action identifying priority project activities to address the most urgent natural resource management needs.

7. On the basis of the discussion during debriefing, and within three weeks of the conclusion of the mission, submit a comprehensive mission report with the revised versions of the two papers in 6 above attached in annex.

B. Consultant on Environmental Planning

1. Visit the operational centres of Operation Salam and the other UN agencies active in Afghanistan - whether in Pakistan, Afghanistan or both - with a view to studying in detail the procedures for planning, priority setting, budgeting, project design, project implementation, monitoring and evaluation in vigour within these organizations.

2. Pay special heed to the extent to which environment and natural resource considerations - indeed the long-term sustainability of development actions - is incorporated in this planning.

3. Prepare a confidential assessment of findings for discussion in the draft stage with IUCN and Operation Salam, including specific proposals directed at each individual agency or at the UN agencies as a whole.

4. On the basis of discussion under 3 above and within three weeks of the conclusion of the mission, prepare a final mission report including the proposals indicated at 3 above.

FOD/MH/wp
March 1990
Salam

# Appendix B

# CONSULTATIONS AND MEETINGS CONDUCTED BY THE MISSION

## GENEVA

Mr. Martin Barber
Chief Mission
UNOCA, Islamabad

Ms. Magda Ninabar
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UNOCA

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Minister of Rehabilitation and Rural Development

Mr. Ghofran
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Mr. Hazrat Hussain Khaurin
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Officer in Charge, Qargha Lake Forestry Nursery, Ministry of Agriculture

Dr. F. Neikzad
Minister of Construction

Col. Shakoor
Director of Demining Cell

**FIELD VISITS**

**Kabul**

Mapping Department
Ministry of Agriculture, Kabul

Qargha Lake Trout Hatchery
Ministry of Agriculture, Kabul

Solar Production Unit
Ministry of Water and Power, Kabul

Qargha Lake Forestry Nursery
Ministry of Agriculture, Kabul

Solar Energy Demonstration Site
UNDP, Kabul

Solar Hot Water Heat Installation
Kabul Orghanage and School, Kabul

## Mazar-i-Sharif

FAO Crop Protection Program

Warehouse Storage for BI58 and BHC pesticide chemicals

- UNOCA Warehouses
- Ministry of Agriculture Plant Protection Warehouse

Plant Protection Department
Ministry of Agriculture

## Peshawar

GTZ Masonry Training Centre

Domestic Energy Saving Project
GTZ Demonstration Site

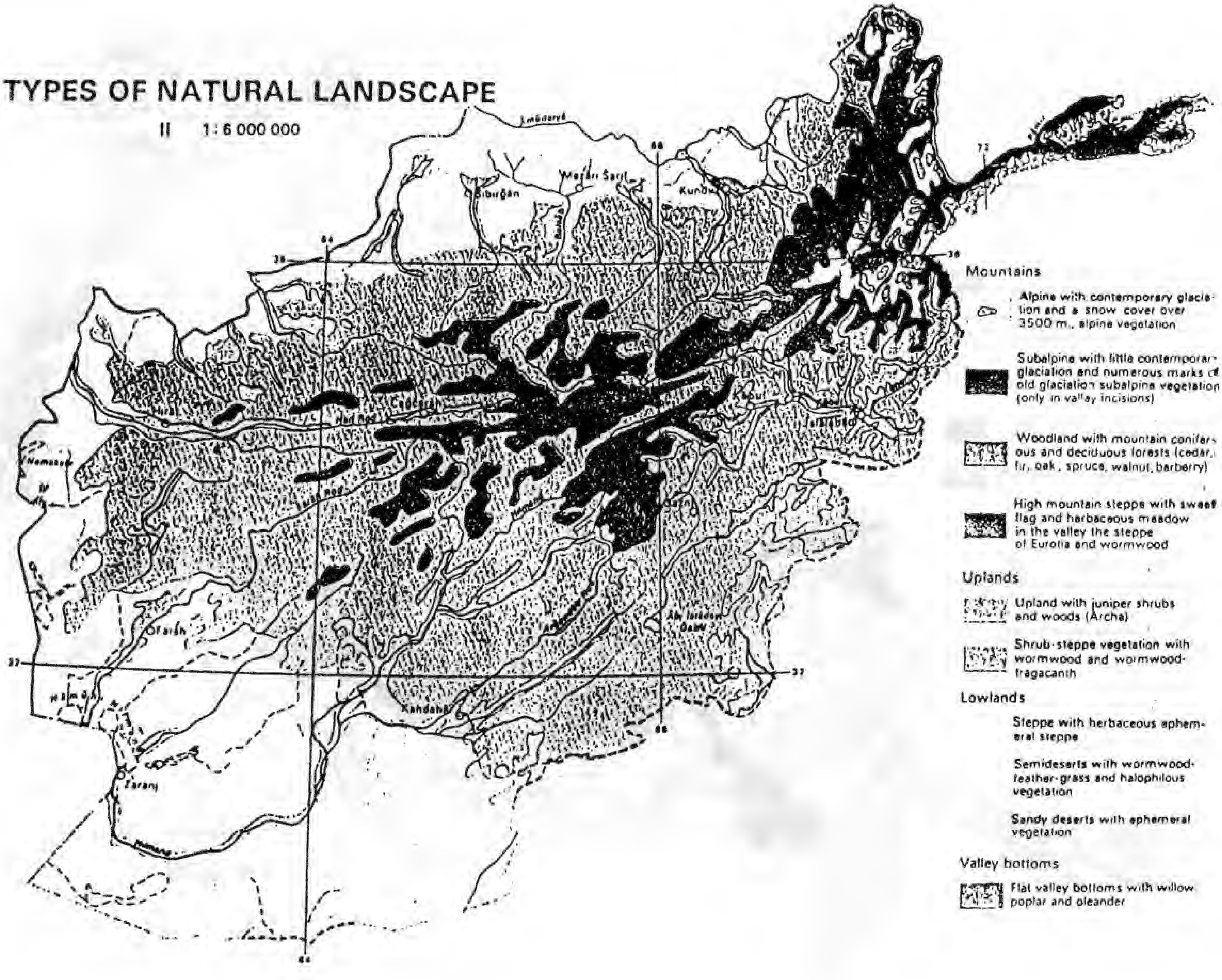
SERVE Solar Oven Demonstration Site

## Appendix C

## NATURAL RESOURCE MAPS OF AFGHANISTAN

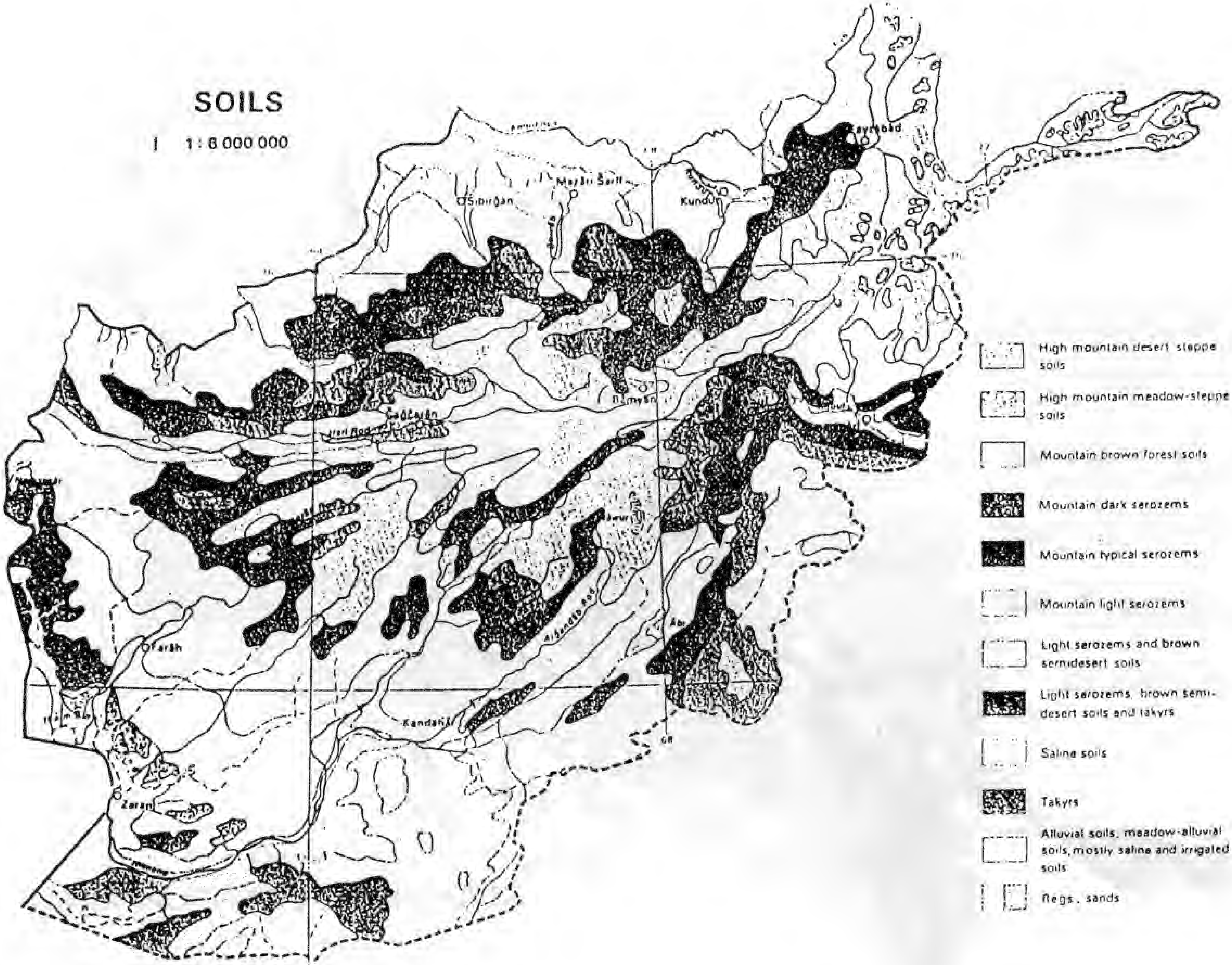
# TYPES OF NATURAL LANDSCAPE

II 1 : 6 000 000



# SOILS

1 : 6 000 000



# 3. OVERVIEW OF NATURAL RESOURCES IN AFGHANISTAN

## 3.1 THE COUNTRY

Situated in central Asia, Afghanistan is a landlocked country of 652,263 square kilometers that shares borders with Iran, the USSR, China and Pakistan. The country rises gradually from the hot, arid plains along the Amu Darya and the Seistan Basin (400 meters altitude), through mountain ranges of the central and northeast, where many peaks exceed 6,000 meters, to Mount Zebak, the highest point in the Pamirs at 7,484 meters.

Rainfall increases from west to east, and vegetation ranges from desert in the south and west, to steppes and dry woodland in the centre and north, to coniferous forests in the humid mountains along the Pakistan border. (FAO, 1981)

The geographical features of the country -- including its landlocked nature, rugged mountainous terrain, large desert areas, limited cultivated land, shortage of water resouces and scattered, often isolated human settlements -- render economic development of the country costly and difficult. Geographical constraints are exacerbated by the 12 year long internal conflict which has produced widespread human suffering and social and economic disruption.

The current population is estimated to be 17.1 million, of which 1.5 million are nomads, and five million are either refugees or displaced persons. (UNDP, 1989)

Afghanistan's economy is primarily agrarian, with agriculture accounting for 78 percent of the total GDP in 1989. Farming provides livelihood to four-fifths of the population and accounts for more than one-half of the total exports of the country.

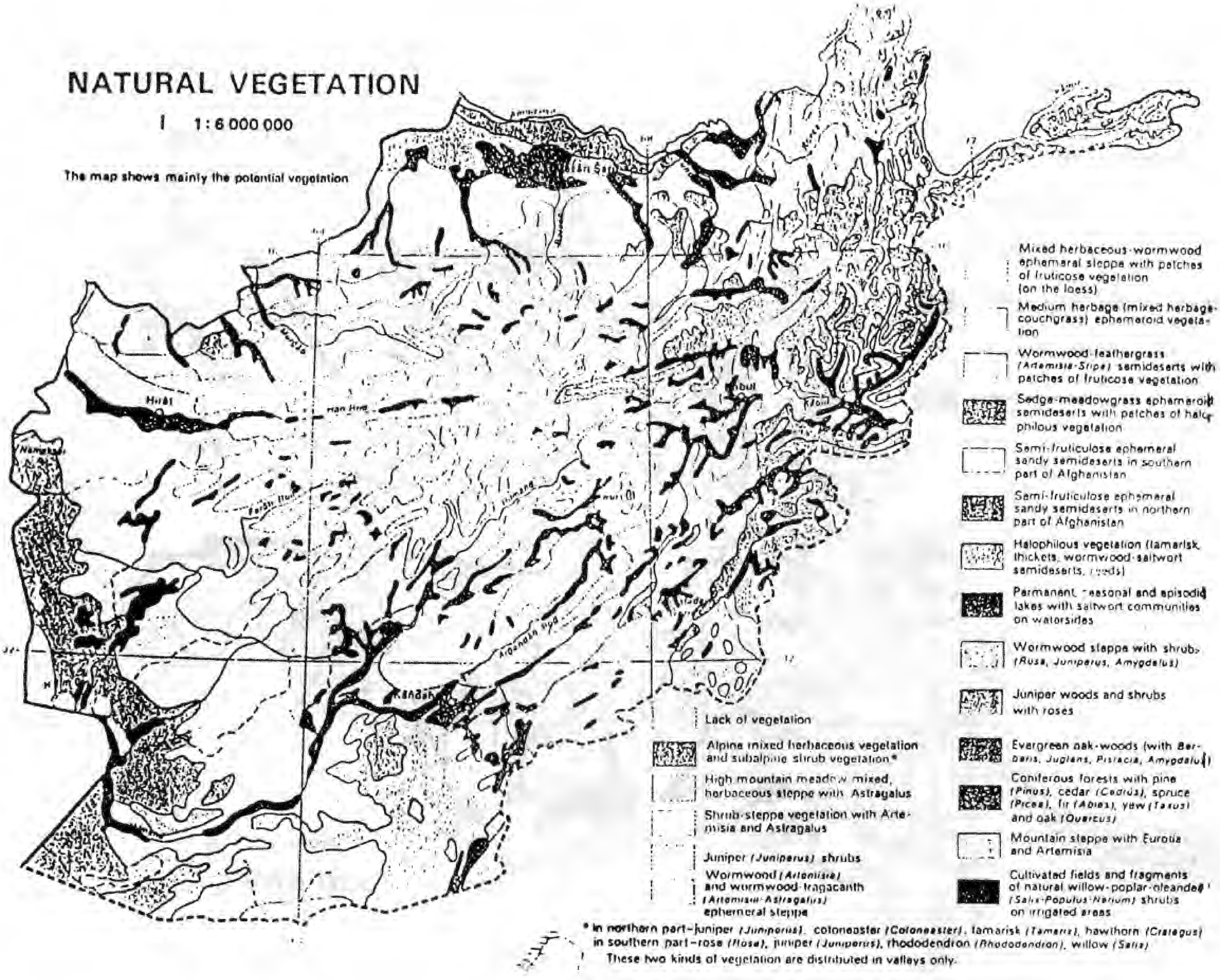
## 3.2 VEGETATION AND FORESTS

According to the World Conservation Monitoring Centre (1988), there is good evidence to suggest that the natural vegetation of large parts of Afghanistan was originally woodland and forest.

The present steppes have resulted from the cutting of wood by man and the grazing and browsing of his domestic animals over millenia, indicating that trends in resource depletion started long before the conflicts of the past 12 years.

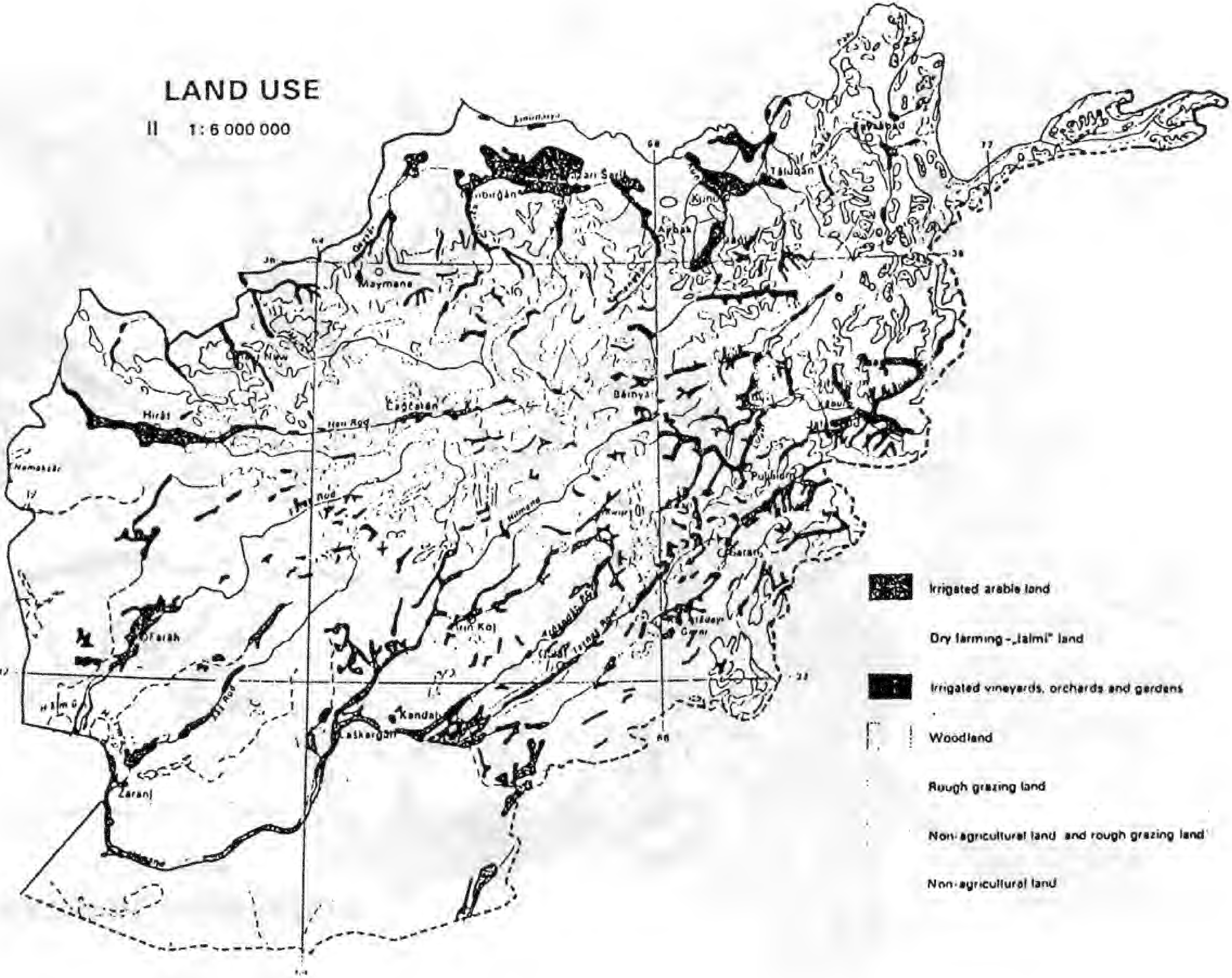
The most complete description of Afghanistan's vegetation found by the Mission appears in a 1981 UNDP/FAO report entitled *Afghanistan: A Contribution to a Conservation Strategy,* by J.A. Sayer and A.P.M. van der Zon.

> The deserts of northern and southern Afghanistan contain active sand dune areas and dunes fixed by open vegetation. The main plants are *Haloxylon persicum, Calligonum* spp and


NATURAL VEGETATION
1 : 6 000 000
The map shows mainly the potential vegetation
Hirāt
Kābul
Kandahār
Mixed herbaceous-wormwood ephemeral steppe with patches of fruticose vegetation (on the loess)
Medium herbage (mixed herbage-couchgrass) ephemeroid vegetation
Wormwood-feathergrass (Artemisia-Stipa) semideserts with patches of fruticose vegetation
Sedge-meadowgrass ephemeroid semideserts with patches of halophilous vegetation
Semi-fruticulose ephemeral sandy semideserts in southern part of Afghanistan
Semi-fruticulose ephemeral sandy semideserts in northern part of Afghanistan
Halophilous vegetation (tamarisk thickets, wormwood-saltwort semideserts, reeds)
Permanent, seasonal and episodic lakes with saltwort communities on watersides
Wormwood steppe with shrubs (Rosa, Juniperus, Amygdalus)
Juniper woods and shrubs with roses
Evergreen oak-woods (with Berberis, Juglans, Pistacia, Amygdalus)
Coniferous forests with pine (Pinus), cedar (Cedrus), spruce (Picea), fir (Abies), yew (Taxus) and oak (Quercus)
Mountain steppe with Eurotia and Artemisia
Cultivated fields and fragments of natural willow-poplar-oleander (Salix-Populus-Nerium) shrubs on irrigated areas
Lack of vegetation
Alpine mixed herbaceous vegetation and subalpine shrub vegetation*
High mountain meadow mixed, herbaceous steppe with Astragalus
Shrub-steppe vegetation with Artemisia and Astragalus
Juniper (Juniperus) shrubs
Wormwood (Artemisia) and wormwood-tragacanth (Artemisia-Astragalus) ephemeral steppe
* In northern part–juniper (Juniperus), cotoneaster (Cotoneaster), tamarisk (Tamarix), hawthorn (Crataegus)
in southern part–rose (Rosa), juniper (Juniperus), rhododendron (Rhododendron), willow (Salix)
These two kinds of vegetation are distributed in valleys only.

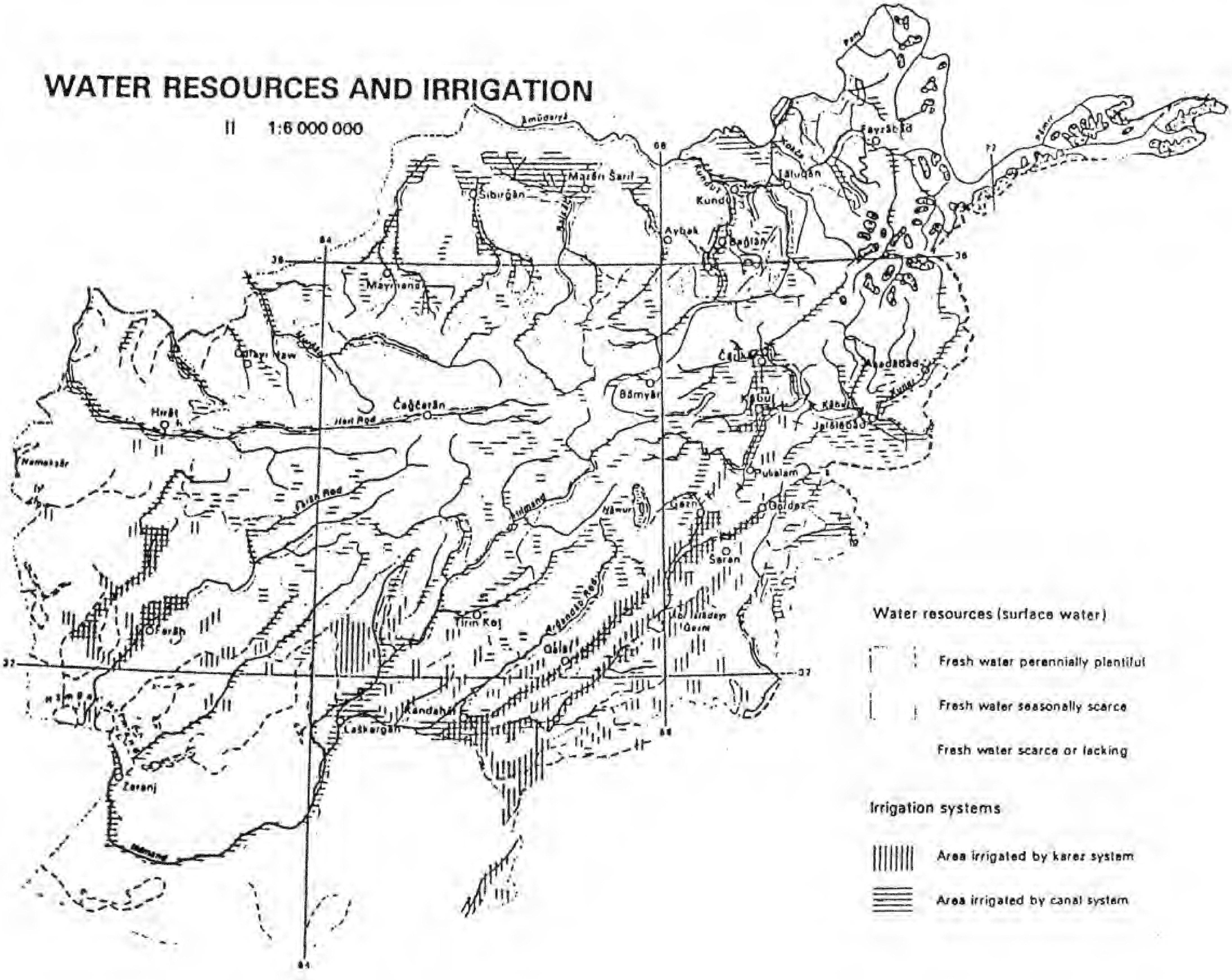
# LAND USE

II 1: 6 000 000



# WATER RESOURCES AND IRRIGATION

II 1:6 000 000




Water resources (surface water)

Fresh water perennially plentiful

Fresh water seasonally scarce

Fresh water scarce or lacking

Irrigation systems

Area irrigated by karez system

Area irrigated by canal system

## Appendix D

## ACBAR GUIDELINES FOR USE OF AGROCHEMICALS

# AGROCHEMICALS

Pests and diseases, especially when conditions are favorable for their development, cause considerable losses to crops. Carrying out the adequate control with the implementation of the most effective means at the right time and proper method is the major task of the plant protectional activities.

Because of the difficulties in diagnosis of the problem, the rapid spread of most of the causal agents and the prevailing difficulties in their control after their occurrence (establishment) makes it more difficult to obtain a successful control under field conditions. On the other hand the control measure(s) applied should be practical and economical and the increase in yield with better quality should be more than the cost for control.

Regulatory, cultural, biological, physical, mechanical and chemical methods are the general ways of controlling pests and diseases of crop plants.

Chemicals, although sometimes widely used for the pest control is one of the measures but not the only one. Priority should be given to methods other than the use of pesticides.

Quarantine, where the practice is to prevent the introduction of a pest especially the ones which do not already exist in a region, is one of the most effective ways of control.

Depending upon the nature of the problem to be controlled or managed, most of the pesticides used in agriculture are known as insecticides, fungicides and herbicides.

Most of these pesticides kill or at least inhibit the target pest, as well as affect man, other living organisms and the whole environment. Some of them have general effect (non-selective), some act on one or a number of groups of pests, while only a limited number of them act selectively and manage only specific pest(s). Furthermore pesticides differ on the basis of their LD50 and persistency. Considering the above explanations one must deal with them cautiously and intentionally. In addition methods do not work.

Based on the above background the following standards are proposed:

## RECOMMENDATIONS:

1. Pesticides are dangerous chemicals. They should only be used wherever there is an urgent need for them.

2. The organizations doing plant protectional works especially the chemical control should fulfil their requirements from "List of pesticides recommended by the Agriculture Sub-committee".

3. Preference should be given to the powder form of the pesticides.

4. All pesticides provided and sent into Afghanistan should have the labels of complete technical information in Pushtu or Dari.

5. Graduates of the department of plant protection, plant sciences, agronomy or at least other potential agriculturalists should be given charge of supervision of the plant protectional activities, especially recommendations concerning pesticide application.

6. Personnel dealing with pesticide application should be trained and upgraded by plant protection experts in relation to the active ingredients, formulations, LD50, dose/liter of water or dose/jerib, persistency, residual effects, transportation, storage etc. of the chemicals.

7. The use of pesticides should not be encouraged in kitchen gardening and other intensive agricultural systems.

8. Seeds treated with pesticide(s) must have clear warnings not to be used for any other purpose except planting.

9. Committees having experienced plant protection personnel can obtain chemicals in addition to the ones listed for their research and trial works and the results should be reported to the Agriculture Sub-committee of ACBAR.

10. For the diagnosis of the pests and diseases, a well equipped plant protection laboratory is needed. Its establishment should be proposed through a potential interested organization dealing with the rehabilitation of agriculture in Afghanistan.

11. In order to follow and study the important plant protection problems and their outbreaks in the ACBAR Agriculture Sub-committee, it is recommended to keep the Agrochemical Working Group (taskforce) existing.

List of Pesticides Recommended by the Agriculture Sub-committee:

| S.N | PESTICIDE NAME | MODE OF ACTION | RATE OF APPLIC. | PESTS CONTROLLED |
|---|---|---|---|---|
| 1. | Metosystox-R | systemic insecticide & acaricide | 0.025% a.i.* | aphids, red spider mites, thrips, white flies, leafhoppers, leaf miners and mealy bugs |
| 2. | Diptrex | contact and stomach insecticide | 0.1-0.12% | cut worm, army worm flee beetle, diamond backmoth fruit borer onion maggot |
| 3. | Sumithion or | contact insecticide | 0.075% | cater pillars (especially co'ling moth), flies, grasshoppers, crickers, aphids, thrips, leafhoppers, white flies, bugs, and psyllids |
| | Methyl Parathion | contact and breathing action insecticide | 0.05-0.075% | |
| 4. | Malathion | contact and breathing action insecticide | 0.125% | thrips, bugs, white flies, aphids, beetles, caterpillars, fruit flies, grasshoppers and ants |
| 5. | Phostoxin | fumigant insecticide | 2 tons per ton precaut. and 3-6 tabs per cub meter of air | stored grain pests |

| | | | | |
|---|---|---|---|---|
| 6. | Cupex Powder | contact insecticide | 1gm/kg of seed | seed treatment |
| 7. | Zinc Phosphide | poison baits rodenticides tracking pwod. | 30gm/kg of bait | rats, mice and ground squirrels |
| 8. | 2-4-D (Hedonal powd) | systemic herbicide | 900-1350 gm/h* spring wheat & 1350-1800 gm/h winter wheat | broad leaf weed especially in wheat fields |
| 9. | Isoproturan (Arelon, Talkan and and Graminan) | selective herbicide | 1000-1250 gm/h | post emergence control of narrow leaf weeds, especially for oats in wheat field |
| 10. | Vitavax (Thiram) | seed dressing fungicide | 2.5 gm/ kg seed | seed treatment against smuts and root rots of the seedlings |
| 11. | Sulpher | protectant fungicide | 0.3-0.5% solution or 20kg/h | powdery mildew of grape vines and many other plants, some effect on spider mites & some insects |
| 12. | Cupravit Blue | contact fungicide | 0.3-0.5% solution of the product | blights, leaf spots, downy mildews, cankers & wounds on branches & stems of trees |
| 13. | Benlate (Benomyl) | systemic fungicide | 0.1% solution of the product | many diseases of fruit, vegetables, field crops, ornamental plants, specially for rice blight & apple scab |

| | | | | |
|---|---|---|---|---|
| 14. | Iron Chelate | plant nutrient | 4-5gms of the product per lit. | treating or recovering iron deficiency in growing plants - sprayed on foliage of the plants |

a.i. = active ingradients

h = hectare

# Appendix E

# COMPRESSED BRICK TECHNOLOGY

perennial *Aristida* spp. In lower lying saline areas, *Chenopodiacae* are dominant and in the saltplains of Seistan the very open vegetation is characterized by *Haloxylon salicornicum, Salsola* spp, *Ephedra scoparia, Tamarix* spp.

The steppes are the most important grazing areas of the nomads, dominated in the west and south by an open vegetation of *Artemisia herba-alba* and other *Artemisia* species, *Zygophyllum* spp, *Acantholimon* spp, *Acanthophyllum* spp, *Atriplex* spp, *Alhagi camelorum, Cousinia* spp, etc. Along dry riverbeds there are thorny belts of *Stocksia brahuica, Amygdalis communis* and *Convolvulus spinosus.* The floral composition is variable and depends on humidity, the length of winter, sand composition, wind force and grazing pressure. More humid places have denser vegetation with a richer species composition. In areas west of Herat with cold winters, *Artemisia* spp and *Ferula* spp (Apiaceae) dominate along with geophytes like *Iris songarica* and *Allium* spp.

In the higher mountains there are areas of semi desert. Around Bamyan they are dominated by *Salsola* spp. High level steppes benefit from a higher precipitation as well as lower evaporation. Overgrazing generally favours the less palatable *Artemisia* scrubs and annuals at the cost of the palatable perennials. In dry years when the annuals do not germinate, heavy mortality of domestic animals occurs.

The original forests of the major river valleys have been replaced by irrigated croplands. Tugai vegetation is found in regularly flooded areas. This is dominated by *Tamarix* spp, willows (*Salix* spp) and reeds (*Phragmites australis*) and, depending on the frequency of inundation, species such as *Populus* spp, *Myricaria* spp, *Berberis* spp, *Crataegus* spp and *Hippophaea* spp. Herbaceous plants are well represented.

Along the river beds on well drained areas with deep soils, many of the wild ancestors of cultivated fruit trees occur. These include the apple (*Pomus* spp), pear (*Pyrus* spp) and almond (*Amygdalis* spp). *Fraxinus* spp, *Acer* spp and *Plantanus* spp also occur.

Hardly any information is available on the vegetation of the lakes but Hamun-i-Puzak and Kole Hashmat Khan were covered with reeds (*Phragmites australis*). The only higher plant in the Ab-i-Estada lake is the pondweed (*Ruppia maritima*) and some Characeae occur in Dashte Nawar.

*Amygdalis* scrublands are intermediate between the steppes of the south and west and the woodland of the Hindu Kush. These areas are important for winter pasture. An *Amygdalis brahuica* community is found between 1,000 and 2,000 m altitude in the dry valleys of the east.

On the higher slopes of the Hindu Kush open *Pistacia* woodlands replace the *Amygdalis* community. These woodlands are heavily used and badly degraded. The southern slopes of the Hindu Kush are characterized by 4-6 m high *Pistacia atlantica* and are rich in herbs like *Gagea, Anemone* and *Allium* spp. *Pistacia khinjuk* and *Cercis griffithi* are found in the Kabul/Logar valley. Above this zone, between 2,000 and 3,000 m and in areas with more than 400 mm of precipitation, a 2.5-6 m high *Amygdalis* community is dominant; many scrub species and geophytes such as *Eremurus, Corydalis, Gagea, Tulipa, Allium* spp also occur.

To the north of the Hindu Kush on the extensive loess plains between 600 and 1,600 m woodlands of *Pistacia vera* with some *Amygdalis bucharica* and in the northeast *Cercis griffithii* are characteristic. The upper part of the forest belt on the northern slopes of the Hindu Kush is formed by an open mixed woodland dominated by *Juniperus excelsa*. The *Pistacia vera* and *Juniperus excelsa* woodlands are heavily exploited for charcoal production.

Perennial grasses and thorny evergreen shrubs and small trees predominate in the lower Kabul

UNITED NATIONS

ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC BANGKOK 10200 THAILAND

# Building Materials and Construction Technologies for Low-Cost Housing in Developing ESCAP Countries

BUILDING TECHNOLOGY SERIES, No 1

# RAMMED EARTH CONSTRUCTION

## Introduction and Summary

The earth used in rammed earth construction is a mixture of gravel, sand and silt, which act as aggregates, and clay, which acts as a binder. By ramming this material in a moist condition, the air gaps are considerably reduced and consequently the bonding of the particles is increased due to the binding force of the clay minerals. As a result, a sufficient loadbearing capacity for walls and high resistance to mechanical destruction is achieved, as well as a better resistance to water.

The compaction of the material is achieved only by dynamic means, as static compaction, which is the force applied by a dead weight acting on the surface of the soil, increases the internal friction of the earth particles, thus reducing the effect of compaction.

Dynamic compaction is achieved by impact or vibration, which develop waves within the soil, causing the particles to temporarily overcome the internal friction and rearrange themselves. In this way maximum density is achieved. This is the principle of rammed earth construction, a building method that has been employed for centuries in many parts of the world.

Generally the earth chosen for rammed earth construction is used in the state in which it is found. If crushing, screening and mixing is necessary, another earth construction method should be considered. Therefore, some simple tests are recommended to ensure satisfactory results.

The method of constructing rammed earth walls is easy to understand. Earth is filled into a formwork in layers of about 10 cm and thoroughly compacted to a thickness of 6 - 7 cm with a ramming tool. When the formwork is full, it is dismantled and moved (usually horizontally) to the next position, fixing it firmly over a previously completed row. In this way the building goes up gradually, layer by layer, whereby it is important to patch up cracks, holes and damaged edges immediately after removing the formwork. Under moderate conditions, rammed earth walls can be resistant to rain and moisture movement, especially where wide roof overhangs are provided. Otherwise a limewash (with some additives) should be applied.

## Assessment

The fact that rammed earth has been the object of intensive research in recent years, is a clear indication that engineers and scientists rate it very highly. Buildings constructed several centuries ago, for instance in Europe, North Africa and the Americas, are undisputable proof of the durability of rammed earth. And with today's scientific knowledge and modern equipment, even better results can be expected, which is why the number of rammed earth construction projects is steadily increasing in many parts of the world.

However, the main advantages of negligible shrinkage cracking and high compressive strength are achieved only with a well trained working team and regular quality controls. The soil has to be of a consistently high quality, and it is strongly recommended that the material be produced by the team that constructs the building.

The time of construction is also important: in humid regions, the rainy season should be avoided; in hot dry climates, the hottest months should be avoided; in temperate or highland regions, rammed earth construction should not be carried out three months prior to or during periods in which frost can be expected.

To a large extent, the choice of formwork and ramming device influences the speed, cost and quality of construction, so that experience and/or several trials with alternative equipment is necessary.

Stabilizing agents (eg cement, lime, etc.) are normally not required and should be avoided as far as possible, but this is only justified with optimum soil qualities and good building design.

Finally, it should be remembered that rammed earth is a natural material, constructed with only a small fraction of the energy input required for other materials to produce structures of similar strength and durability. It also causes no wastage or pollution, and when demolished, soils that contain no stabilizer can be reused over and over again.

With all these considerations, rammed earth construction is a highly recommendable technology of relatively low cost and good quality, but this is only true if carried out with well trained workers.

## Formwork

There are numerous types of formwork, varying in material, size, weight, mobility and complexity, but the main points to be considered are:

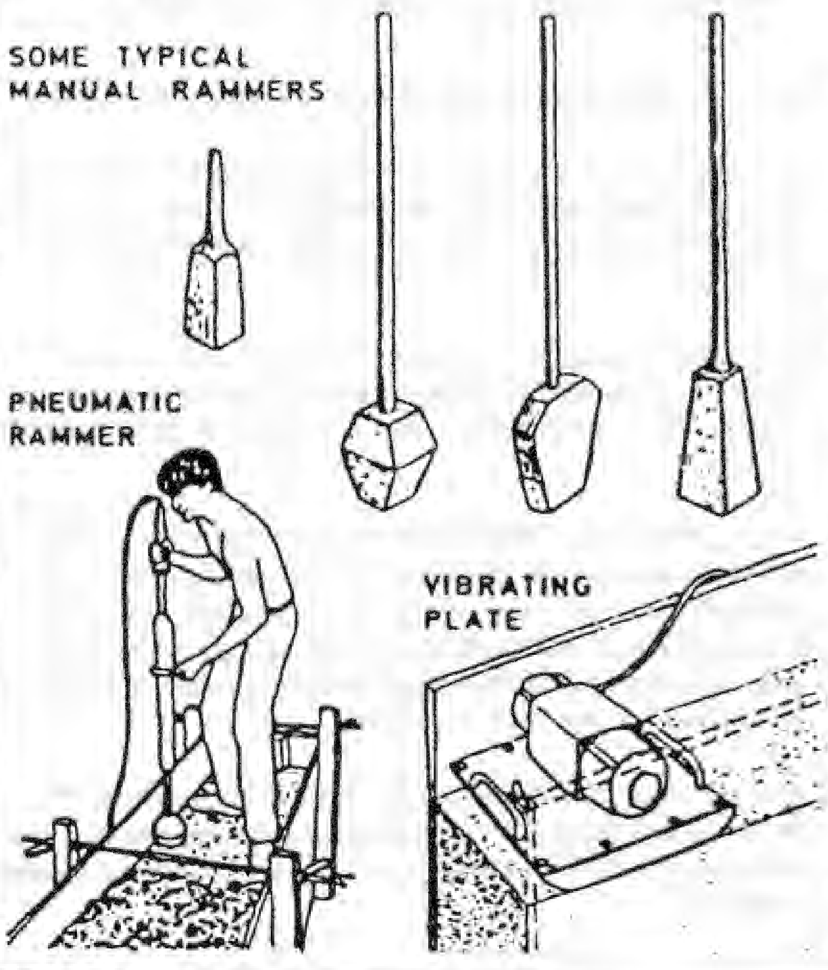
- the formwork must be more rigid than standard concrete shuttering, because of the high outward pressure of compacted earth;
- it must be relatively light and easy to dismantle and assemble, so that the work does not become too tiring and time-consuming;
- it should be the largest size that can be reasonably handled, in order to reduce the number of moves;
- and it should permit the wall thickness to be varied.

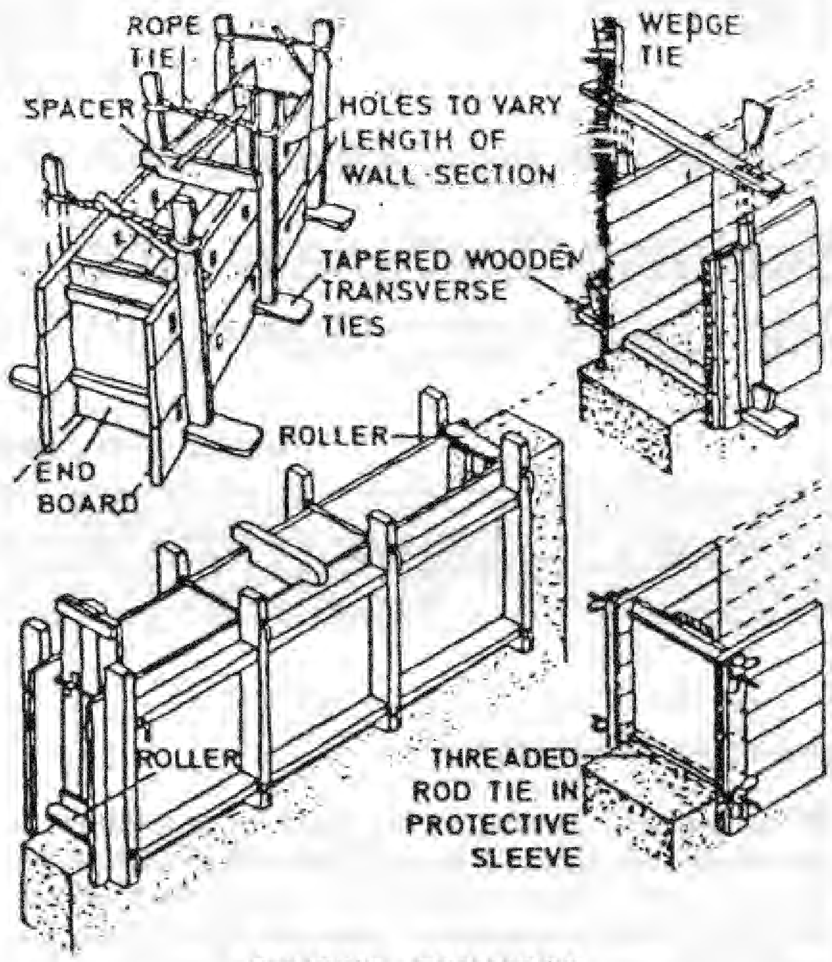
The basic elements of the formwork are:

- the two sides, made of timber planks, plywood boards or metal, with adequate bracing;
- vertical posts, 50 to 100 cm apart, depending on the thickness of the planks, held together on top and below with transverse ties of wood, threaded rod or rope (mainly on top);
- wooden spacers, to keep the sides apart at the desired distance;
- and, in most cases, an end board, to close off the open side of the formwork.

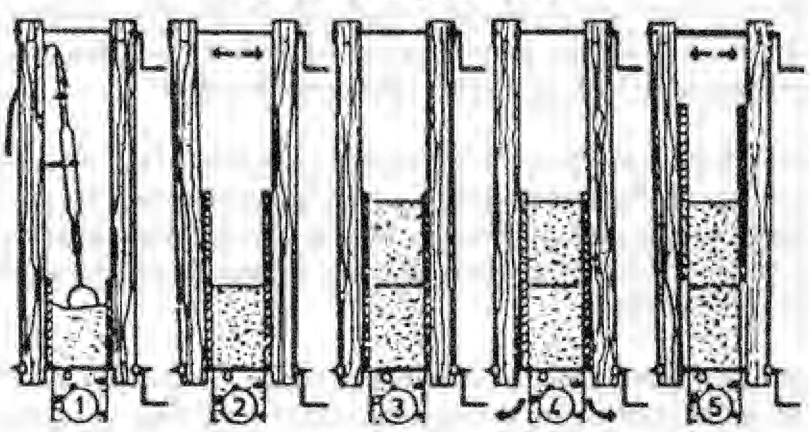
Different methods of assembly are illustrated. The formwork is normally moved horizontally after each section is completed. In order to avoid the horizontal cracks that tend to develop between successive rows of rammed earth (since each row dries out separately), a climbing formwork was developed at Kassel University, Federal Republic of Germany (Bibl. 3).

The length of traditional formworks ranges between 120 and 180 cm, the height between 50 and 100 cm. Ideally, the ratio of wall thickness to wall height should be between 1 : 8 and 1 : 12 (the latter requiring good quality control), but rammed earth walls can be of any appropriate thickness, depending on the requirements. However, for a man to stand between the two sides of the form to compact the soil, a minimum of 40 cm is recommended.




CLIMBING FORMWORK




## Rammer

Soil compaction can be done with simple manual rammers or with mechanical devices, such as pneumatic rammers and vibrating plates.

Manual rammers consist of a wooden or steel rod with a heavy wooden or metal striking head. The weight can vary between 1 and 8 kg. Numerous shapes of the striking head have been developed, but the main requirements are:

- avoidance of damage to formwork (therefore, edges not too sharp);
- good compaction in corners (hence conical shape);
- uniform compaction and speed of operation (so the base should not be too narrow).

Pneumatic rammers imitate the manual rammers, but achieve much higher impact frequencies (up to 700 strokes per minute), thus reducing construction time, but their cost is high. Heavy duty vibrating rammers and pick hammers (as used for road building), are not recommended. An alternative is a small vibrating plate, developed at the Kassel University. An electric motor with an eccentric rotating mass transmits vibrations to the plate (with a vibrating frequency of 1000 to 1500 r.p.m.), thus causing the machine to move.

## Soil

The most appropriate soil for rammed earth construction contains 50 to 75 % gravel and sand, 15 to 30 % silt and 10 to 20 % clay (cohesive particles). A well graded mixture of all particle sizes is ideal to ensure that all air gaps are closed by compaction and drying shrinkage is reduced to a negligible scale. If crushing, screening and mixing are necessary, another earth construction method should be considered. Well graded and well compacted soil normally requires no additives for stabilization.

Since the aim is to use the soil in the state in which it is found on the site, the simplest test is to press a handfull of earth into a ball. The minimum moisture content is one that only just permits the ball to retain its shape.

In order to test the suitability of the available soil, it is advisable to prepare small wall sections using earth samples from different excavations and applying the same ramming technique as for the final construction. The sections can be made in simple wooden forms of the same width as the wall to be built, but only 80 cm long and 50 cm high. The sections must dry for a day or two, after which no cracks should be visible (sign of too much clay) and, after a few weeks, the edges should be able to withstand being chipped off by hand.

## Construction

A stone, burnt brick or concrete foundation and base course (at least 30 cm above ground level and exactly as wide as the earth wall) are required to start with. The top surface must be horizontal (requiring steps on sloping sites) and should never project beyond the external face of the earth wall. A damp proof course (such as 2.5 cm 1:3 cement:sand mortar, or 1:2:4 concrete, or thick plastic or bituminous membrane) between the footing and wall is recommended in moist environments.

Depending on the formwork chosen, gaps may be necessary for the transverse ties to fit in. To facilitate removal, the wooden ties should be slightly tapered. In the case of threaded steel rods, a metal or plastic tube can serve as a protective sleeve.

The sides of the formwork should overlap the wall section below by 10 to as much as 50 cm to protect the lower layer. By fastening the transverse ties and placing the spacers and end board(s), the formwork can be accurately set in place, either plumb or with a slight batter (inclination). The work should always begin at a corner.

Sufficient soil should be prepared before commencing the actual wall construction, to ensure continuous work. However, regular moisture checks and, if required, re-moistening are necessary.

The soil is filled in the formwork in layers of about 10 cm. The person who rams the soil stands on it or on the top edges of the formwork, and strikes the soil systematically, first along the sides and then in the centre. The operation is completed, when the sound of each stroke of the rammer changes from a dull to a solid clear sound. The layer will then be reduced to 6 or 7 cm. Once the formwork has been completely filled and compacted, it is dismantled and moved to the next section. The freshly made wall section should be covered with an appropriate material (grass, leaves, cloth, plastic sheets) for protection against rain, wind or direct sunshine.

Care must be taken to stagger the joints between each row (just as in masonry work). The end boards should not be just flat, but should produce an indent, such that adjoining sections interlock with each other. Similarly, cross-wall junctions should be made to interlock connecting walls. Wall anchors and reinforcements (eg at corners) made of metal strips or rods, strong twigs, split bamboo or rope, can be placed in these junctions and building corners during compaction.

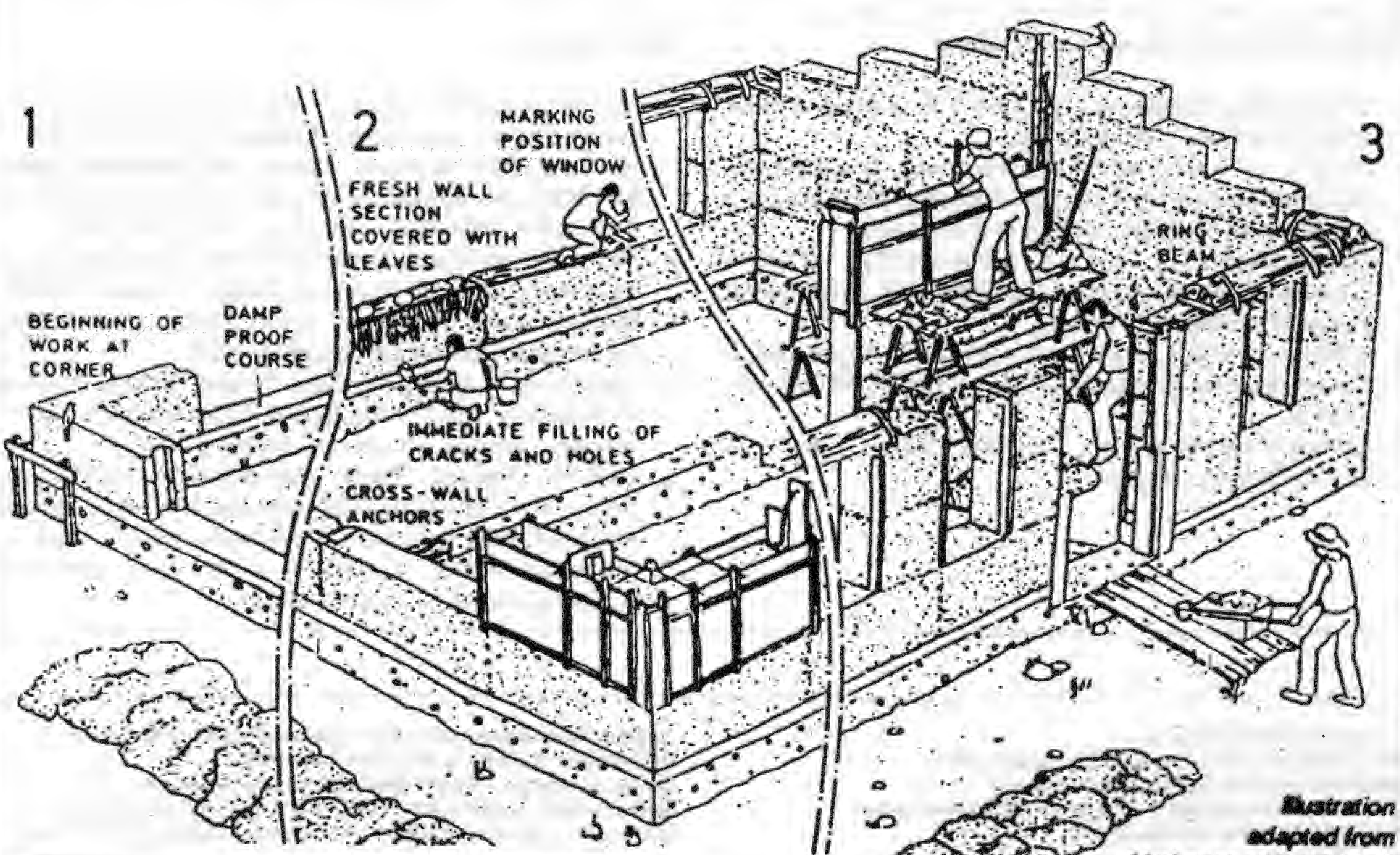
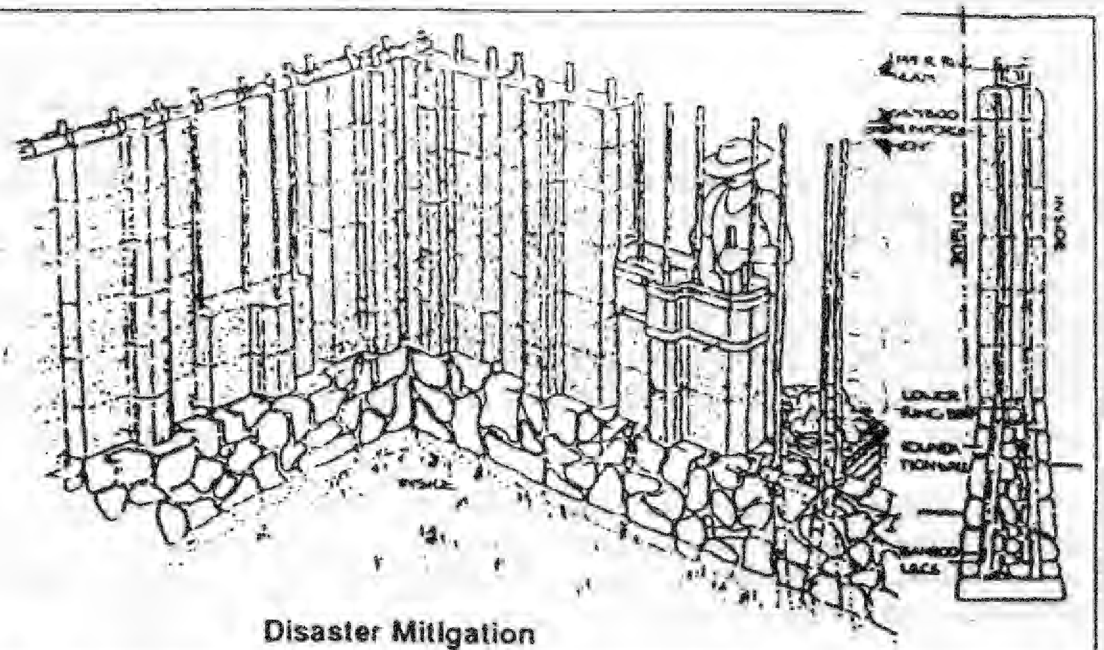



Illustration adapted from Vorhauer, 1979 (Bibl. 7)

*Experimental earthquake resistant rammed earth construction, with independent, bamboo reinforced T-shaped vertical wall sections, which are held together on top by a bamboo ring beam:*
*Prototype house built in Guatemala by G. Minke together with German and Guatemalan students, 1978 (Ref. Bibl. 3 and 7)*



## Openings

Window and door openings should be planned such that they do not complicate the formwork or filling process. Ideally, their sides should correspond to the ends of formwork sections, and their height should be in line with the top of the last layer, so that the ring beam will substitute the lintel. It is also possible to insert the window and door frames within the formwork and attach appropriate anchors, so that the frames are rigidly fixed to the wall. In the case of finely grained soil, small openings can also be easily cut into the finished wall by means of a large knife or a length of wire rope with handles at each end used by two men.

## Surface Treatment

It is vitally important for the durability of the wall that all chipped-off edges, cracks and holes are filled and compacted, immediately after removing the formwork, as the patching material does not bond with partially or fully dried up walls. Rammed earth walls can be resistant to rain and moisture movement, particularly, if the roof overhang protects the wall from rain. A suitable paint is a limewash mixed with whey (liquid formed by making curd from milk), some clay and a little salt and alum (used in paper-making and leather tanning)

## Disaster Mitigation

More important than the construction method, is the quality of building design, when considering the capability of rammed earth structures to withstand extreme conditions. But, in general, rammed earth is fire resistant and its earthquake performance may be considered comparable to average masonry structures, while slashing rain and floods over longer periods can cause the outer wall layers to disintegrate. Although insects and rodents are known to penetrate other mud buildings, rammed earth offers great resistance.

## Training

Of the various soil construction techniques, rammed earth probably requires the most skill and experience. The selection of a good soil, the accuracy of fixing the formwork, the correct method of tamping and patching up damaged surfaces are all factors that require good training. It is also essential for architects and engineers, who wish to employ this technique, to undergo the same training, in order to understand the possibilities and limitations of the technology, so that they may select the most appropriate formwork and coordinate all the dimensions to suit its size.

## Research and Development Institutions

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2. Institute of Construction Training and Development, National Housing Development Authority, Sir Chittampalam Gardiner Mawatha, Colombo 2, Sri Lanka
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Consultants: Kiran Mukerji (F R Germany), G C Mathur (India)
Preparation of leaflet: K Mukerji (1989)

Building Technology Series, No 1 : Rammed Earth Construction
ESCAP/UNCHS Joint Unit on Human Settlements
Division of Industry, Human Settlements and the Environment
United Nations, Economic and Social Commission for Asia and the Pacific
United Nations Building, Rajadamnern Avenue, Bangkok 10200, Thailand

# UNITED NATIONS

ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC BANGKOK 10200 THAILAND

# Building Materials and Construction Technologies for Low-Cost Housing in Developing ESCAP Countries

BUILDING TECHNOLOGY SERIES, No 2

# COMPRESSED EARTH BLOCKS

## Introduction and Summary

Of all common earth construction techniques, building with sun-dried bricks or blocks is the most widespread, easiest to learn and most versatile method, permitting the construction of loadbearing walls, columns, vaults, domes, and numerous other applications.

Traditional sun-dried earth blocks, also called mud bricks or "adobe", are made in different ways, with or without moulds. A very common method is to prepare a malleable mixture of earth and straw (or other fibres), which is poured or thrown by force into wooden or metal moulds (depending on the consistency of the mix). After removal of the moulds, the blocks have to remain where they are to dry before they can be removed for stacking. This requires a large production area.

The blocks dealt with in this paper are made with sufficient initial strength for them to be removed and stacked immediately, thus needing a relatively small production area and less number of operations before the blocks are ready for use.

The earth is compressed in a mould which can have a variety of shapes, depending on the type of block required (solid, hollow, perforated, interlocking, etc). Compression can be done by tamping the earth in a mould using a small pestle or piece of wood, by forcefully closing a heavy lid on the mould, or by using a block press, of which a large number of different types are available on the market, with outputs ranging from 15 to 1500 blocks per hour.

The compression can be static (by applying a dead weight on the surface of the soil) or dynamic (by impact or vibration) or a combination of both. The aim is to allow the smaller particles (clay and silt) to fill the gaps between the larger particles (sand and gravel), all of which stick together due to the binding force of the clay minerals. This calls for a good particle size distribution and sufficient clay content (at least 10% by weight).

Poor soils can be improved by adding more sand or clay, as is required. Alternatively, or in addition, a stabilizer (eg cement, lime, bitumen) may be used in suitable proportions (usually between 3 and 19% by weight) in order to obtain certain desired performances, such as better resistance to water or impact.

Thus the normal production process involves soil extraction, possibly crushing or sieving, mixing, compressing and drying or curing. The process can be easier and less expensive if lower quality blocks are used in well designed buildings and are protected by an appropriate surface coating.

## Assessment

The advantages of building with compressed earth blocks as compared to traditional hand-made earth blocks are:

- the ability to carry them away by hand immediately after production,
- the small drying and storage space requirement, as the blocks can be stacked immediately or on the day after production,
- easy transportation of dried blocks with low breakage rate.

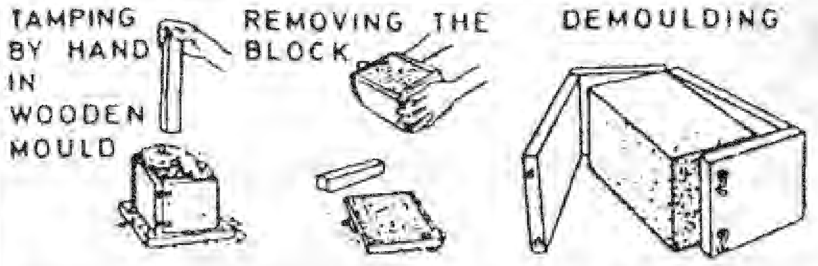
The main drawbacks are:

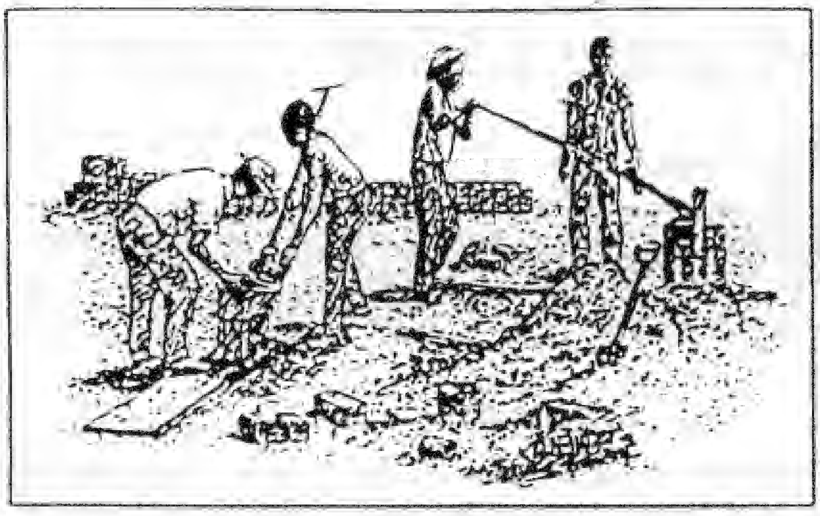
- higher capital and labour costs, and
- the need for more soil testing and quality control.

Compared with other masonry elements, such as burnt bricks and concrete blocks, the advantages of compressed earth blocks are that they are produced at lower cost and with less energy input and air pollution, while the main disadvantage is their lower water resistance.

It should, however, be noted that no block press, whether manually operated or mechanized, can make good blocks from just any soil. In other words, a good soil in a poor press may easily give better results than a poor soil in a good press.

To achieve satisfactory results, training programs are necessary which involve all phases of block production and utilization in building construction within the local context, whereby technologies applied in other regions or procedures described in publications should only serve as guidelines. Soils and working conditions can vary considerably from place to place and can, in each case, require different procedures, which are often developed through trial and error. Good compressed earth block production is therefore a matter of experience.



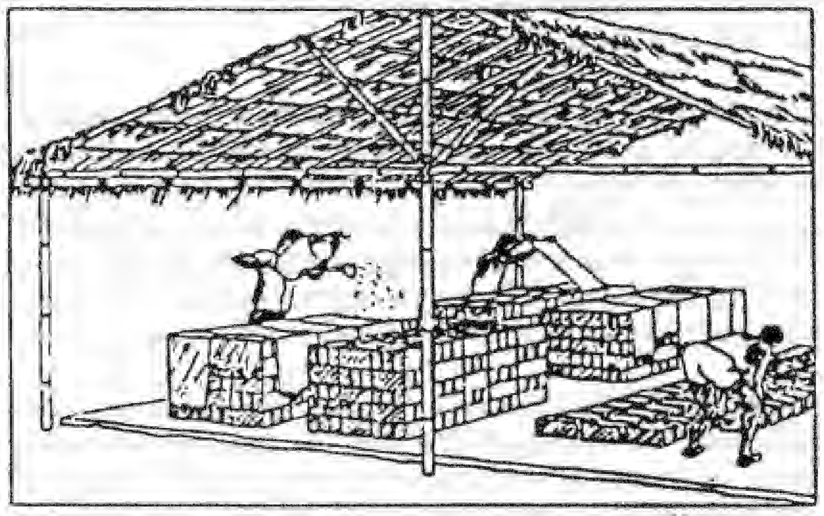



## Making the Blocks

Compaction of the soil mix in a mould can be done dynamically (ie sudden impact by tamping) or statically (ie gradual compression). Static pressure is obtained by blockmaking machines, which has become the most common method.

The simplest, but slowest and most tiring method of block production is by tamping the soil in a mould (usually with hinged or detachable parts).

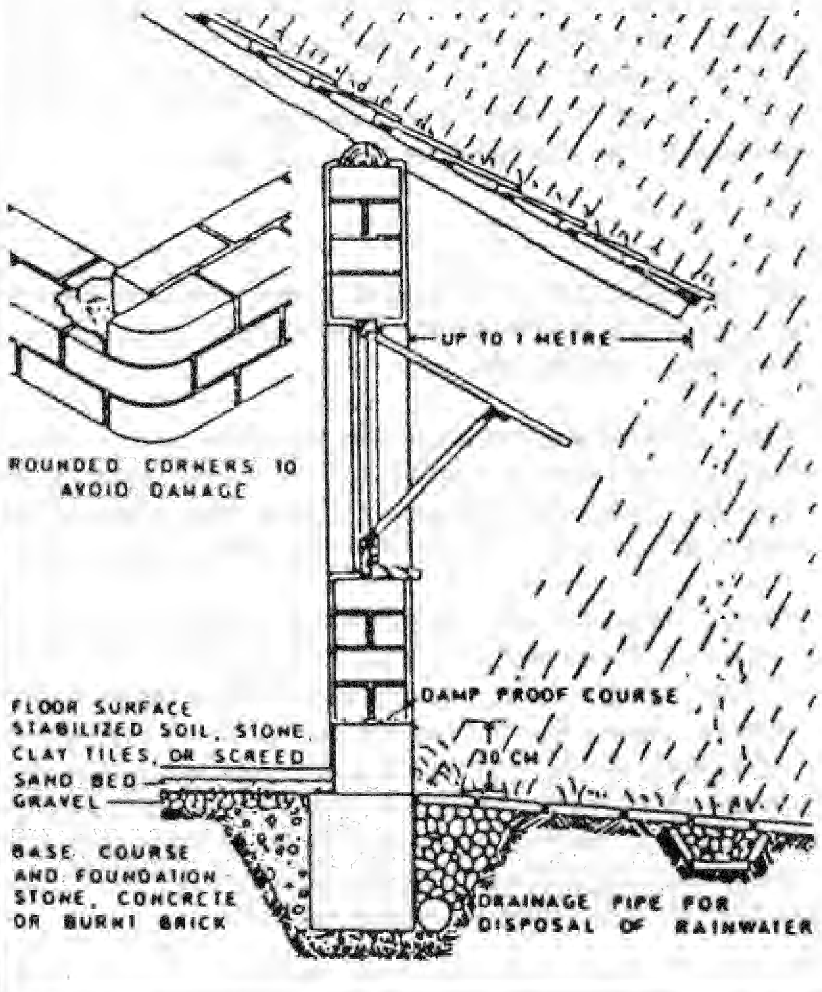
More efficiently, a block press is used, in which the soil mix is compressed to about 60 % of its original volume. The machines are either manually operated or motorized, but the procedure always involves filling the mould(s), compacting the soil (sometimes after pre-compaction), demoulding the block and removal to the drying area. On average, a team of 3 people is needed to operate small manual presses and remove the blocks. They must be assisted by a team of workers, who excavate and prepare the soil at the same pace as the blocks are produced.



## Drying and Curing

Unlike traditional hand-moulded mud blocks, which have to be left to dry where they are made, compressed earth blocks are carried to a shaded curing area. Weakly compacted blocks are laid in rows on the ground and stacked a day later, while denser blocks can be stacked up to 5 layers immediately.

If bitumen stabilizer is used, curing can be completed within 5 days, whereas cement requires at least 15 days (preferably 30 days) and lime at least 30 days. With both cement and lime, the blocks must be kept moist for the first 5 days by covering them with plastic sheets or laying coarse absorbant material (eg sacks, mats) over them and sprinkling it with water.




## Design and Construction

Special attention must be paid to good bonding and use of an appropriate mortar. For stabilized blocks the mortar should have 50% more binder than the blocks. Lime may be added for better workability; it will delay curing, thus reducing the likelihood of cracking.

Foundations should be of water resistant materials such as stone, burnt brick or concrete, or very well stabilized blocks. The same applies to a base course of at least 30 cm height, to avoid damage due to splashing rainwater. The ground surface around the building must be designed to drain off water.

In the case of unstabilized blocks, corners of walls are likely to be damaged by impact, abrasion or water. Rounded corners, either by producing special bricks, carving or polishing them after completing the walls, have proved to be a good remedy. Cutting or carving soil blocks requires no major effort and no special tools.

The roof overhang is of great importance in areas of medium to high rainfall. Normally 30 to 40 cm overhangs are sufficient, but on the windward sides better protection of the walls is needed against driving rain.

## Soil Selection

The most suitable soils for compressed block production have sand and fine gravel contents of about 80 %, and a minimum clay content of 10 %. The recommended area in the chart gives the impression that very few soil types fall within this group, but in reality their availability is almost universal. It is excavated after removing the topsoil in order to exclude organic matter. To achieve satisfactory results, however, some field tests are necessary. Whenever specific characteristics are to be assured, laboratory tests are required in addition to field tests.

## Soil Identification

Preliminary soil identification is done by observation, smell and touch, which can roughly indicate the presence of topsoil (smell of organic matter), too much sand (no cohesion when moist) or too much clay (forming hard lumps when dry, but becoming soft and sticky when moist).

- The simplest field test is to squeeze an earth sample into a ball and drop it onto a hard surface from about 1 metre height. If the ball flattens without disintegrating, it is too moist or too clayey, if it disintegrates completely, it is too dry or too sandy. The optimum moisture content (OMC) will make a firm lump which breaks apart into a few smaller pieces when dropped.
- The suitability of the earth mix (with or without a stabilizer) is best found by trial and error. Sample blocks are made from different soil types and mixes, using the same method that shall be used for full-scale production. After one day, a good unstabilized block will show no sign of cracking, twisting or bending; after a few weeks, particles cannot be easily scratched off the surface with fingernails; and the edges cannot be easily chipped off by hand. A good stabilized block will not suffer any damage if hit with a steel nail from a distance of 5 to 10 cm.

If needed, the recommended laboratory tests are:

- Linear shrinkage test (using a long wooden box, in which a moist soil sample is allowed to dry, showing the percentage of shrink, from which the clay content can be determined, as well as the type and recommended quantity of stabilizer);
- Grain size distribution analysis (using a series of sieves, the finest being at the bottom, to determine the relative weight proportions of the different sized particles);
- Sedimentation analysis (using two graduated 1 litre flasks, a hydrometer, thermometer and stop watch, to determine the proportions of the fine particles of less than 0.08 mm);
- Atterberg limit tests (a set of tests to determine the soil's sensitivity to water, by measuring its liquid and plastic limits);
- Proctor compaction test (using a special device and graphical evaluation to determine the optimum density and moisture content for block production).
- Further tests may also be needed to identify the clay mineralogy and deleterious components (eg salts, chlorides).

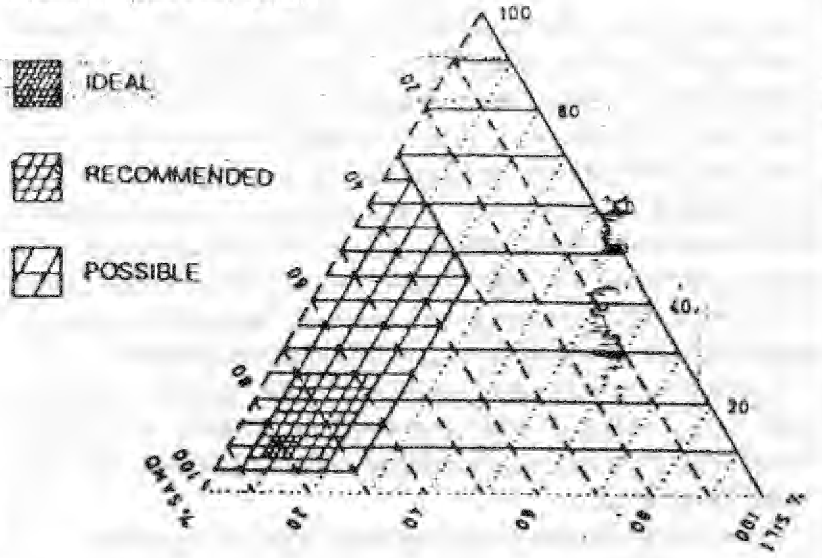
## Soil Preparation

Soils are rarely found in the state required for block production. In most cases, they need to be ground and screened through a wire mesh to obtain a maximum grain size of 10 mm.

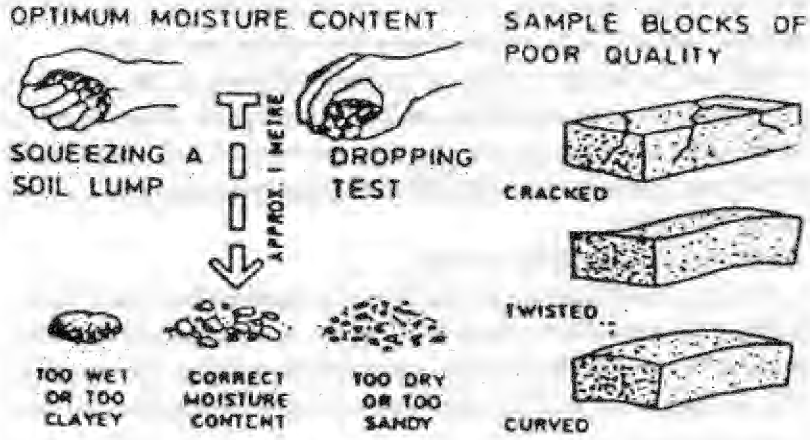
Mixing should take place close to the block mould and all additives thoroughly blended in the dry state. Unlike mixing concrete, the predetermined quantity of water must be sprinkled for even distribution. When using cement as the binder, only so much material should be prepared, as can be used up in about 20 minutes, with lime there is no time limit.

It is advisable to check the moisture content of each new mix by means of the ball test for OMC, as described above.

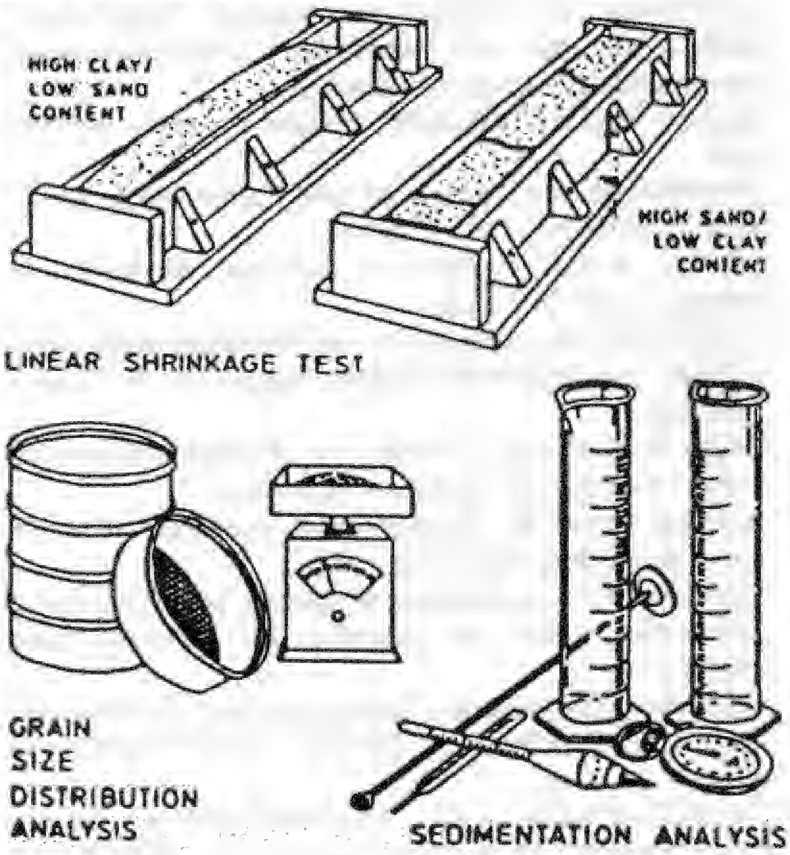
*Soil Composition Chart*



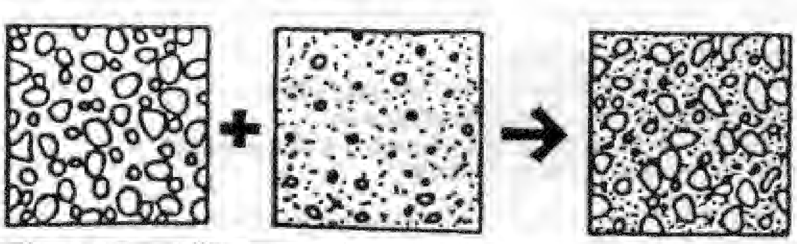

*Simple Field Tests*




*Some Laboratory Tests*




*Correction of Grain Size Distribution*



## Wall Finishes

Well compacted soil blocks with a good grain size distribution normally resist weathering well without rendering. But renders not only provide weather protection; they can help to reduce heat gain by reflection, provide surfaces that are easy to maintain, and improve appearance (where unplastered walls are disliked). The choice of renders depends on the quality of blocks and the desired function. The poor adherence of plasters to stabilized soil blocks calls for special care. Soil based plasters (at least 2 layers) are the most appropriate, though performances differ according to the type of stabilizer used:

- Cement: only with sandy soils, (cement : soil between 1:20 and 1:12). Adding lime improves workability and slows hardening, thus reducing cracking. Adding bitumen improves water resistance.
- Lime: largely preferable to cement (lime : soil between 1:10 and 1:5). Adding pozzolanas, such as fly ash, rice husk ash, pulverized burnt clay (surkhi), or cement improves strength. Adding horse urine or cow dung results in more hardness, less shrink, better insect resistance, but possibly low acceptance by people. Adding whey (from milk) also improves strength.
- Bitumen: used as "cut-back" (mixed with solvent like gasoline or kerosene) or as emulsion (mixed with water), the proportion of bitumen increasing with the clay content of soil. Application of two thin coats is most effective for waterproofing and can last up to 10 years.

Wall finishes can also include:

- Paints of various types, which are best when used with a primer; limewashes mixed with whey or linseed oil are best, applied in several thin coats; bituminous coating on dry, dust-free surfaces are suitable as a primer; cement washes can also be used for stabilized blocks. However, treated surfaces must be well maintained, or else they are better left untreated.
- Timber or mat facing, either nailed on directly or fixed on a lathing for better ventilation, is a more laborious and expensive solution.

## Disaster Mitigation

To avoid flood damage of unstabilized earth constructions, the prime requirement is safe location of the building. Alternatively, the floor level should be raised above the expected flood level, and designs should ensure quick draining of water in and around the house. Prevention of earthquake damage calls for extremely good masonry workmanship, simple symmetrical designs on horizontal building sites (avoidance of hillsides), avoidance of heavy roofs, provision of strong timber or reinforced concrete ring beams with strong connections. Reinforced masonry is recommended and regular building maintenance is vital.

## Training

It must always be remembered that, contrary to common belief, building with earth is *not a simple technology*. The mere fact that natives of many countries have been building their houses with earth since thousands of years does not mean that the technology is sufficiently developed and known to everyone. It is indeed the lack of expertise that brings about poor constructions, which in turn gives the material its ill reputation. However, sufficient knowledge and efficiency can easily be acquired by unskilled workers with proper training and guidance.

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3. Development Alternatives, 22 Olof Palme Marg, Vasant Vihar, New Delhi 110 057, India
4. ASTRA, Indian Institute of Science, Malleswaram, Bangalore 560 012, India
5. Thailand Institute of Scientific and Technological Research (TISTR), 196 Phahonyothin Road, Bang Khen, Bangkok 9, Thailand
6. Regional Centre for Research on Human Settlements, Jalan Tamansari 84, Bandung, Indonesia
7. Building Research Establishment, Overseas Division, Garston, Watford WD2 7JR, U.K.
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Preparation of leaflet: K Mukerji (1989)

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# Appendix F

## EXCERPT FROM UNDP ENVIRONMENTAL GUIDELINES

## QUESTIONS ABOUT ECONOMIC DEVELOPMENT AND SUSTAINABLE DEVELOPMENT

- Do the country's development programme and the support sponsored by UNDP, propose self-sustained activities?

- Does UNDP Technical Cooperation to the country promote the development and adoption of technology for sustainable development (i.e.technology which is resource-saving, pollution-preventing, and environment restoring)?

- Does the development programme of the country and/or the activities sponsored by UNDP, demand present environmental sacrifices which will affect future generations?

## QUESTIONS ABOUT RESOURCE USE

- What would be the cost of environmental degradation if a resource was misused or mismanaged?

- What would be the economic benefits if the resource was used appropriately? To whom do the benefits go?

- Are there any alternative ways of utilizing the resource in order to achieve the benefit of its use and protect the environment?

## QUESTIONS ABOUT OPPORTUNITY COST OF RESOURCE USE

- Within the considerations of the implementation of UNDP assistance to a country, which is the optimal resource allocation which has the highest potential to preserve and enhance the environment and its natural resources?

- Are there alternatives to resource allocation that would maximize opportunity costs and environmental performance? Would this require any modification of intended UNDP assistance?

Valley, which experiences hot summer and moderate winters. Heavy grazing and fuelwood collection have reduced the shrubs and led to an increase of annuals. A *Zizyphus nummularia* community occupies the lower regions (up to 750 m). This is replaced at higher levels with a *Salvia-Pistacia* community. In the drier higher valleys *Acacia modesta* penetrates the vegetation. Between 700 and 1,300 m there is sometimes a 25 m high *Reptonia buxifolia* and *Olea ferruginea* woodland which is over exploited for fodder and as pasture land.

Between 1,200 and 2,000 m the oak *Quercus baloot* dominates a forest with rich undergrowth and several tree species including almonds (*Amygdalis kuramica*) and pistachios (*P. khinjuk*). It is heavily used for fodder, fruits and fuelwood and large parts have been destroyed to provide fuel for Kabul and Kandahar. The *Q. baloot* forest in the Panshir valley northeast of Kabul forms the westernmost extension of the Himalayan forest belt.

In very humid places with high summer rainfall, *Q. baloot* is replaced by *Q. dilatata* and between 2,400 and 2,900 m by *Q. semecarpifolia* associated with *Juglans regia, Acer turkestanicum* and *Pyrus pashia.*

The forest belt between 2,200 and 2,500 m is a 5-12 m high *Pinus gerardiana* woodland with local stands of *Betula.* A thorny *Cotoneaster-Sophora-Rosa* scrubland colonizes the areas after the pine has been felled.

Between 2,500 and 3,100 m *Cedrus deodora* forest is found. Depending on soil and humidity the cedars may be up to 50 m high and form a very dense forest. Large parts of the Cedrus forest have been exploited and replaced by a stable *Artemisia* community. Logging throughout the forests of the eastern provinces has increased steadily reaching even the western parts of Nuristan.

In the humid areas the upper belt of the forest, up to an altitude of 3,300 m, is formed by a 20-25 m high *Picea smithiana Albies webbiana* forest and in the dry areas by a 10 m high *Juniperus seravschanica - J. semiglobosa* woodland. However most areas have been cut for fuelwood and mature stands are rare. The herbaceous groundcover, especially along the streams, is heavily overgrazed. (FAO/UNDP, 1981)

Perhaps the most frequently reported trend in resource use is the serious depletion of Afghanistan's forests. With only one exception, all persons from UN agencies and NGOs interviewed by the Mission felt that deforestation was occurring at an unsustainable rate:

In the eastern provinces it is reported that trees such as oak, previously reserved for timber, are now being cut for fuelwood, and the last old growth forests are being cut in Kunar and lower Nuristan to sell to Pakistani traders as beams for carved doors and construction. There have been reports of as many as 20 to 30 trucks daily, each loaded with 100 beams 300 centimeters in length and sold for Rs. 50 in the forests by villagers and Rs. 900 in Peshawar by Afghan and Pakistani traders. (MADERA, 1990)

In the northeastern provinces the valuable pistachio natural forests are being cut for fuelwood and timber; this species is reported to be reaching wood markets in Kabul. (Alam, UNOCA, 1991) Throughout Afghanistan trees have been cut extensively by the military and villagers for fuelwood and construction purposes. In addition, the military have cut windbreaks along roadways for maximum visibility of enemy movements.

Even small bushes are used for firewood in some areas, thus accelerating soil erosion and desertification. In areas of marginal land, cow dung and agro-wastes that could provide

# OPPORTUNITIES FOR IMPROVED ENVIRONMENTAL MANAGEMENT IN AFGHANISTAN

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## PART TWO: OPERATIONAL PLAN



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F Excerpt from UNDP Environmental Guidelines

REFERENCES

ATTACHMENT:
"Environmental Screening of NGO Development Projects"
*Five booklets published by the Canadian Council for International Co-operation*

# PART ONE

# TECHNICAL REPORT